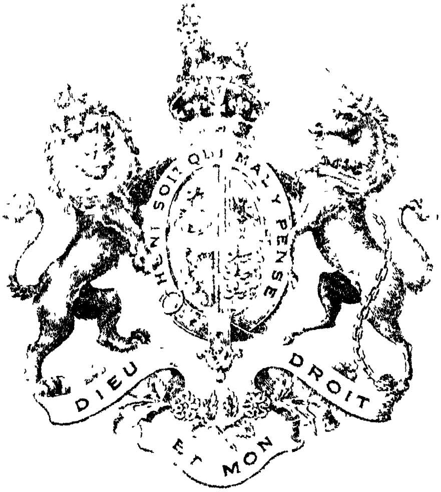
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AGRICULTURAL RESEARCH INSTITUTE

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Vol. III—No. 1.

JANUARY 1933.

THE M.A.H.A. MAGAZINE

(The official organ of the Malayan Agri-Horticultural Association.)

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THE
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(The Official Organ of the Malayan Agri-Horticultural Association.)

Vol. III. JANUARY, 1933. No. 1.

Page.

Foreword. By Dr. H. A. Tempany, C.B.E. Director of Agriculture, S.S. & F.M.S. .. 1

Editorial .. 3

HORTICULTURE.

Useful Literature for Malayan Gardeners . 5

Maidenhair Ferns. By R. E. Holttum, M.A. (Cantab), F.L.S. 8

Hints on the Use of Fertilisers. By A. R. Westrop. No. 1. Pot Plants .. 12

Garden Planning in Malaya. By F. Flippance, F.R.H.S. .. 14

Length of Day and the Flowering of Plants. By R. E. Holttum, M.A. (Cantab), F.L.S. .. 18

Arranging Cut Flowers. By C. Van Dort .. 20

POULTRY AND PIGEONS.

The Lahore Pigeon. By E. W. Cooke .. 22

Rickets in Chickens. By J. K. Hutchison, B.V.Sc. .. 28

Ducks bring Profit to Farmer .. 31

PIGS.

The Need for Registration. By W. Leggatt 33

Proposed Scheme of Pig Registration .. 33

MISCELLANEOUS.

Film Propaganda in Malaya. By L. D. Gammans, M.C.S. .. 35

Goat Keeping as a Side Line. By T. Murari, B.Sc., (Oxon.), F.L.S. .. 38

An Effective Rat Trap .. 34

DISTRICT NOTES.

Report of District Show held at Kuala Selangor .. 40

Foreword

BY

DR. H. A. TEMPANY, C.B.E.

Director of Agriculture, S.S. & F.M.S.
Vice-President of The Malayan Agri-Horticultural Association.

I have been asked to write a foreword to this number of the M.A.H.A. Magazine, which after an interval of four years, now makes its re-appearance.

I do so with considerable pleasure as I feel that the step now taken to revive the periodical is one of considerable potential utility.

The Malayan Agri-Horticultural Association has been in existence for a period of ten years; during that time its activities have been considerable; it has come to be regarded as an organisation which has a very definite and useful part to play in Malayan affairs, particularly in connection with the organisation of the Annual Malayan Agricultural Exhibition and also of Shows and Exhibitions in the various districts of the country. Of late years it has carried on its work under considerable difficulties, partly as the result of the universal depression; nevertheless it has carried on, and the results, in particular, of the 1932 Exhibition in Kuala Lumpur constitute a striking proof of the practical utility of its efforts.

To be entirely effective, an organisation of this type must be free from associations of a political or racial character; it must unite within its numbers all classes, races and creeds in an effort for the common good, and these desiderata the M.A.H.A. can fairly claim adequately to fulfil.

The nature of its constitution and the value of its work have received testimony by the fact that Governments assist it by grants in aid, while throughout its existence Government officials and Government Departments have supported and participated in its activities.

It is recognised that competition, publicity and propaganda through the means of shows and exhibitions constitute one of the most effective means of improving agricultural methods and diversifying production; for this the existence of a permanent organisation which concerns itself with this form of activity is very desirable inasmuch as it provides a means for maintaining contact with the unofficial section of the community, ensures continuity and saves much preliminary work which is inevitable if the holding of shows is confined to *ad hoc* efforts in particular districts.

This the Department of Agriculture has throughout appreciated and has given its full support and collaboration to the work of the Association; in the early days much of the initial organisation and secretarial work was performed by members of the staff of the Department, and while, in recent years on account of development and extension of the operations both of the Department and of the Association, it has been found impossible to continue this arrangement, the closest support has been maintained and the Department recognises that the Association constitutes the ideal medium through which its activities along these lines can be exercised.

The M.A.H.A. in its original form comprised a parent organisation with its headquarters in Kuala Lumpur, to which were linked various branch organisations in the various districts of Malaya. The activities of these branches have to some extent languished of recent years; in one or two cases their place has been taken by other organisations which are not connected with the M.A.H.A. It is felt that this is unfortunate and that if possible an effort should be made to resuscitate and extend the activities of the branches wherever this may be possible.

It is believed that the revival of this Magazine may serve a very useful purpose by giving greater publicity to the work and activities of the parent Association, by serving as a means for disseminating information concerning the activities of the headquarters and branch Associations, and by providing a definite link throughout Malaya for work along the lines which the Association is intended to fulfil.

Apart from its activities in relation to Agricultural Exhibitions there are many directions in which the Association is capable of useful effort, e.g., by periodical meetings and discussions it should be able to assist in the ventilation of ideas, in the formulation of schemes for development and in the dissemination of information on agricultural and horticultural topics; in this work a journal can play an invaluable part.

I trust that the effort, of which this issue of the Journal constitutes the emblem, may in due course bear fruit and that as a result it may look forward to a career of continually extending utility.

H. Tempany

Director of Agriculture.
S.S. & F.M.S.

Kuala Lumpur,
21st December, 1932.

THE
M.A.H.A. MAGAZINE

JANUARY, 1933.

EDITORIAL.

After a lapse of several years, the M.A.H.A. quarterly magazine re-appears, and as befitting the change of period, it has changed its costume and makes its bow in a new guise.

We make no apology for this re-appearance at a time when conditions seem to be, and let us hope are definitely at their worst. The Malayan Agri-Horticultural Association does, however, owe an apology to its staunch ordinary members, who, by virtue of their membership, are entitled to free copies of the Association's publications. Circumstances made the continuance of the original "M.A.H.A." impossible, and it is in the nature of keeping faith with members that we again come into print.

But that is not the only reason for this venture into the uncharted seas of amateur journalistic effort. To the pessimist, gloomily calculating his overdraft, and to the sceptic, who assures us that no one wants another magazine, we would reiterate the well known truth that when conditions are blackest and the future seems hopeless, then is the time to put forth the biggest effort and to summon up all the resources of courage and optimism available.

Agriculture, poultry farming, stock and pig breeding are quite obviously closely connected with the economic welfare of Malaya. Native Arts and Crafts form a commercial outlet for energies which might be diverted into less attractive channels. Horticulture may perhaps be regarded as rather in the nature of a luxury than of commercial possibilities, but the beautifying of a town through its gardens is no mean achievement, and the solace that flowers can give at the end of a tiring day, is not to be despised.

These subjects, and others, will be dealt with in *The M.A.H.A. Magazine*, and to each will be devoted a separate section. The articles and notes which will appear in these sections, will, we think, prove of interest and definitely helpful.

More and more people are becoming interested in poultry farming, not overlooking the careful housewife who keeps a few birds to meet home requirements, and a magazine should constitute a valuable medium for the discussion of difficulties encountered and a bond towards closer co-operation throughout Malaya.

The Pig Section at the Annual Malayan Exhibitions has been a popular feature, and the Chinese small-holder is already a large breeder in the Peninsula. Commercially, the pig industry has a big future if properly controlled and if greater attention is given to breeding. We give, in this issue, the outline of a suggested scheme of pig registration, which, through the medium of a pig section, we hope to put on a working basis.

We are particularly fortunate in having the assistance and co-operation of Mr. R. E. Holttum, the Director of Gardens, S.S., who has very kindly consented to edit and take under his wing the Horticultural Section. Those of our readers who are ardent amateur gardeners have, therefore, the satisfaction of knowing that their particular section is in safe hands, and the present issue will be an indication of the excellent things in store.

The Director of Agriculture, S.S. and F.M.S., Dr. H. A. Tempany, who has contributed a Foreword, has very kindly promised the co-operation of his Department and access to agricultural journals and publications not readily obtainable in this country.

Quite a large number of people are interested in breeding cats and they are not being forgotten. Here again, however, space does not permit of a Cat Section this quarter, but we have the promise of an article for our next number, from the pen of Mr. W. D. Mavor, who is a well known Kuala Lumpur breeder.

Other features we hope to incorporate are District Notes, reports of District Shows, and articles on native customs and of general interest. This quarter we publish an article on Film Propaganda Work contributed by the Co-operative Societies Department, and in succeeding numbers we hope to give further notes on the work done by this Department.

We think we can safely claim, therefore, that we provide substantial and varied fare for the modest sum charged for this magazine, and we confidently appeal to all English speaking residents of Malaya to give us their support.

One other aspect of *The M.A.H.A. Magazine* must not be overlooked. There are now several small Associations and Societies in Malaya which have interests mutual with those of the Malayan Agri-Horticultural Association, and of each other. We feel that our magazine should form a valuable medium for linking up such bodies, and it is our hope that, gradually, Societies, which have no publication of their own, will adopt *The M.A.H.A. Magazine* as their official organ and thus make closer co-operation an established fact.

We would emphasise that this magazine is not merely a publication to 'boost' the Malayan Agri-Horticultural Association. We naturally have the interests of that Association at heart, but to-day is essentially the time for co-operation and cumulative effort and not for the stressing of the individual, or individual body. We want genuinely to be of assistance to readers who are interested in the subjects dealt with by us, and we do feel that at the present time there is an opening for a magazine such as ours.

Finally we would invite the criticism and suggestions of our readers and crave their indulgence for any shortcomings in our first issue.

Horticulture.

USEFUL LITERATURE FOR MALAYAN GARDENERS.

1. *Gardening books and papers relating only to Malaya.*

    GOUGH, Kathleen: *A garden book for Malaya.* H. F. and G. Witherby, London, 1928. 16s.

    MORFORD, E. St. Clair: *Gardening in Malaya.* Grenier, Ipoh, 1926 $1.25.

    CURTIS, C.: On the cultivation of pot plants. *Agri. Bull. of the Malay Peninsula, no. 7, 1897, pp. 150-176.* 20 c.

    CURTIS, C.: Elementary notes on the propagation of plants. *Agri. Bull. of the Straits and F.M.S., Vol. 1, 1901, pp. 73-79.* 50 c.

    M.A.H.A. Magazine, Vols. I and II, 1927-1929.

    MALACCA HORTICULTURAL SOCIETY: *Amateur Gardening,* 1931 and 1932. .75 c. each.

    MALAYAN ORCHID SOCIETY: *The Malayan Orchid Review.* No. 1, out of print. No. 2. .50 c.

2. *Gardening books relating to places outside Malaya.*

    BURNS, W.: *Firminger's Manual of Gardening for India, 6th edition.* Thacker, Spink & Co., Calcutta, 1918.

    MACMILLAN, H.F.: *Tropical gardening and planting, with special reference to Ceylon.* 3rd edition. Times of Ceylon Co., Colombo, 1925. £1.17.6.

    BAILEY, L.H.: *Standard Cyclopaedia of Horticulture.* The Macmillan Co. New York, 6 volumes. 2nd edition 1917.

3. *Books about Fruit and Vegetables.*

    MILSUM, J.N.: *Fruit culture in Malaya.* Dept. of Agriculture, F.M.S., Bull. no. 29, 1919 (out of print).

    BUNTING, B. and J. N. Milsum: *The culture of vegetables in Malaya.* Dept. of Agriculture, S.S. and F.M.S., 1930. $1.50.

    OCHSE, J.J.: *Vegetables of the Dutch East Indies.* Dept. of Agriculture, Buitenzorg, Java, 1931. 17.50 guilders.

    OCHSE, J.J.: *Fruits and fruit culture in the Dutch East Indies.* G. Kolff & Co. Batavia, 1931. 17.50 guilders.

    WESTER, P.J.: *The food plants of the Philippines.* 3rd edition, 1924. Bureau of Agriculture, Manila, Bull. no. 39.

4. *Books relating to special groups of plants.*

    BLATTER, E.: *The Palms of British India and Ceylon.* Oxford Press, 1926.

    SCHLECHTER, R.: *Die Orchideen,* 2nd edition, 1927. Berlin, Paul Parey, 50 marks.

The first two books on the above list are the only ones which deal exclusively with Malayan gardening. Mrs. Gough's covers the whole range of gardening practice, and also describes all the more important ornamental plants locally cultivated. It contains much practical advice, based on considerable experience of Malayan conditions, and every keen gardener should at least consult it. Mr. St. Clair Morford's book, the articles by Mr. Curtis, and those by Mr. Badger in the Malacca Horticultural Society's publications, are especially recommended to beginners, and to those who find they are not getting such good results as they could wish. These articles are full of valuable hints relating to the details of gardening practice, those details which are so essential to really good results and which are so easily overlooked. The writers are all men of thorough practical experience. Mr. St. Clair Morford's book is unfortunately marred by numerous mis-spellings of plant names. The late Mr. Charles Curtis's articles are mentioned as being probably the first of their kind locally published, and because he was one of the best and keenest gardeners who have lived in Malaya. The parts of the Bulletins in which they are issued can still be purchased at the Botanic Gardens, Singapore. Careful attention to Mr. Badger's articles in the Malacca publication would alone be adequate for the needs of many people who have small gardens and wish to make the best of them. For details of orchid culture, Mr. Galistan's articles in the Malayan Orchid Review are very valuable.

Thus the essentials of Malayan gardening practice, and many of the minor details also, have received treatment in print, and are available to interested persons. It is probable that future articles will to some extent cover the same ground again, but there is still much to be recorded in the way of special methods of culture and propagation for different plants, trials of new plants, the production of hybrids, garden design, and other topics, so that the horticultural section of this magazine should not lack for material to fill its pages.

The books in the second section are written primarily for gardeners in other countries, so that cultural directions cannot be taken as certainly suited to Malayan conditions and can only be regarded as suggestions for trial. They are however useful for the descriptions and illustrations of plants which they contain, and are interesting as indicating how plants behave in other tropical countries. Macmillan's book is very fully illustrated with photographs, and the illustrations are perhaps the most valuable part of the book for Malayan residents. The chief disadvantage to the book is that it covers so much ground that few subjects are treated very thoroughly. Bailey's Cyclopaedia covers the whole range of cultivated plants, temperate and tropical, and is the most complete work of its kind. It is very valuable as a reference book for its descriptions of plants. It is fully illustrated. The later 3-volume edition is abridged, and contains fewer descriptions of individual species than the 6-volume edition.

Everyone who grows vegetables should have Bunting & Milsum's book on vegetable culture. It deals with all the common vegetables which can be grown locally. Ochse's book on vegetables in the Dutch East Indies is a much larger work, and contains descriptions of a very large number of plants (with many of which most Europeans are quite unfamiliar); all the plants are illustrated with line drawings. The same author's book on fruits is not so large, but is illustrated with very fine coloured illustrations. Wester's book on Philippine fruits and vegetables is fully illustrated with photographs.

Father Blatter's book on palms contains descriptions of all the commonly cultivated local species, but no cultural details. The illustrations are unfortunately not very well reproduced. Schlechter's book is probably the most complete recent general work on orchids. It is beautifully illustrated, and contains nearly 1000 pages of text. All ornamental species of orchids, from all parts of the world, are described. There is no single book in English which quite covers the same ground.

We still need illustrated books descriptive of our locally cultivated ornamental plants, and we hope that the near future will see some part of our need fulfilled. By way of a beginning, we propose in the pages of this journal to give a series of articles of a descriptive nature, taking one group of plants at a time and dealing with them as thoroughly as possible.

Since going to press, we have come across another local gardening book: *Amateur Gardening*, by Mrs. W. S. Gibson, published by Kelly & Walsh, Singapore, price $1. It is now in its second edition. This little book, written by a local amateur gardener who has achieved good results, is a useful record of personal experience in local gardening practice, simply written. It deals with herbaceous flowering plants, flowering shrubs and climbers, and vegetables. If any reader knows of any other local gardening publications we shall be glad to hear of them.

MAIDENHAIR FERNS,

BY

R. E. HOLTTUM,

M.A. (CANTAB,) F.L.S.

Director of Gardens, S. S.

Maidenhair ferns are grown as pot plants by nearly everyone in Malaya, and for graceful decorative foliage they have few rivals. Besides being beautiful, they are very interesting plants, and there are a large number of different kinds. In this article it is proposed first to give a general account of the group, of methods of cultivation, and then to give descriptions and figures of the most commonly grown species.

General Account.

Maidenhair ferns are so called because of the very fine hair-like branches of the fronds of the more delicate kinds. Botanically they are known as Adiantum, from a Greek word meaning unwetted, because raindrops immediately fall off the leaves without wetting them. They have short creeping rootstocks which bear slender leaf stalks, often black and shining but sometimes covered with chaffy scales. The leaves may be unbranched, with a single row of leaflets on each side, or they may be branched, the branches often again branched and bearing numerous small leaflets. The leaflets are very varied in size and shape in the different kinds; the character which they have in common is the way in which the spores are borne. Round the edges of the leaflets are little recurved flaps, circular, kidney-or crescent-shaped, and the spore-bearing organs (sporangia) are borne on the under side of these flaps. The flaps are known as indusia. The spores are microscopically small, and serve instead of seeds to reproduce the fern plants. Fern plants may be grown from spores in the way described below, but are more usually propagated by division of the rootstocks.

Though maidenhair ferns are found native in all sufficiently warm and moist parts of the earth, nearly all the most decorative kinds are found in the American tropics, and practically all those commonly grown in Malaya are of American origin. Some of them have been known for more than 100 years, but many were introduced into cultivation about 50 to 70 years ago, during a period when the cultivation of tropical foliage plants was given more attention in Europe than it is at present. The firm of Veitch introduced a number of fine varieties, including *Adiantum peruvianum*, the finest large species we possess. Charles Curtis, first Curator of the Waterfall Gardens, Penang, was earlier in the employment of Veitch as a collector, and in the eighties and nineties he introduced to Penang a number of these new kinds. A few of the commoner kinds must have been introduced a good deal earlier. After the natural species were introduced to the hothouses of Europe from Peru and elsewhere, there appeared in cultivation a number of new forms, some of which had evidently arisen by accidental crossing of the different species, while others were probably varieties developed spontaneously under the conditions of cultivation. After this was discovered, quite a business was made of the production of new varieties by the sowing together of spores of different species, and a number of horticultural forms were so produced and afterwards propagated vegetatively. The numbers of the *Gardeners Chronicle* for the years 1865 to 1885 contain frequent references to these new forms and varieties, and descriptions of them. After that period the interest in them seems to have become less. Many of these forms were so much alike that it is difficult to recognise them with certainty from descriptions. Fortunately illustrations of a number of them were published, and Mr. Curtis preserved specimens, which we still possess, of the ferns introduced by him. Even with this help, there is some doubt as to the names of some varieties, but the position of the more important ones is clear. It is likely that some of the varieties which have been introduced to Malaya have been lost. At the same time, it is also certain that some new varieties have arisen in cultivation here, in the same way as in Europe. Mr. Ridley described six of these varieties in 1909, and others may have also been produced. It is interesting that all Mr. Ridley's varieties were derived from the species *Adiantum tenerum*, which is the one which most freely reproduces itself under local conditions. It is possible that if anyone took the trouble to experiment with cultivating the spores of other species he could raise new varieties of them also.

In Malaya we have five or six native species of Adiantum, but all are relatively small plants, and not very much cultivated. The best is *A lunulatum*, which makes a pretty basket plant. The only local species which resembles in habit the typical maidenhairs of cultivation is *A. stenochlamys*, which is found among shaded rocks close to the sea. It is rather a small stiff plant, and not so easily grown as the exotic species.

Cultivation of Maidenhair Ferns.

Nearly all maidenhair ferns are rock plants, their roots finding a hold and protection in the crevices, their fronds hanging down and forming a graceful cover over the surface of the rocks. They will often grow in this way on an old wall, and in shady rockeries they may be given a habitat very like that of their native condition. They may also be grown in pots, and in potting them it is well to remember the conditions of growth to which they are naturally suited. The first consideration must be to give them an open soil with good drainage, so that the roots may have a good air supply and are never waterlogged. Leaf-mould and sand, with some fibrous material to keep the mixture open, makes a satisfactory potting medium, or burnt earth may be used. The exact nature of the soil is not so important as that it should be well aerated. It is quite a good plan to fill the pots with pieces of old coral and broken brick, with a little leaf mould to fill up some of the crevices. The plants should be watered sparingly. They do not need a great deal of water, and if too much is given the soil in the pots will become sodden and root growth will be checked. The exact amount of watering required depends on the nature of the soil and the position in which the plants are growing; watering on alternate days is often enough. Care should be taken that plants with young expanding fronds are not allowed to become too dry. The plants are best grown in a sheltered position, where they are protected from direct sun at least during the heat of the day. They should also be protected from heavy rain, or if they cannot be so, particular care should be taken to see that the soil is kept in good condition.

When plants are repotted, no manure should be given until new growth has started; after that, a regular application of small amounts of manure will accelerate growth and produce fine healthy plants. It is essential to give organic manure of some kind; pure inorganic fertilisers are not satisfactory. Dried cowdung is quite good; it may be broken into small pieces and mixed with the top layers of soil. Ground-nut cake is also very satisfactory. It must be well rotted in water first for at least three weeks (kept in a covered vessel) and then a small quantity of the liquid given weekly or fortnightly to each plant, after the ordinary watering. If too much is given, it may cause shrivelling of the young leaves (owing to root damage) and a check in growth, but if the correct amount is given regularly the plants will make steady new growth. The disadvantage of the rotted ground nut cake is its foul smell, which lasts for a few hours after each application. This smell, and indeed all unpleasantness, is avoided by using a prepared and properly balanced organic fertiliser such as blood and bone mixture. In any case, the secret of success is the regular application of small quantities of manure.

Propagation from Spores.

Some kinds of Maidenhair ferns may be grown from their spores quite easily. There are many ways in which this can be done, but the following directions are probably the most suitable. Take a shallow pot and fill it nearly full with small pieces of old broken brick. Fill in the top with finely broken brick, pieces not more than ⅛ inch in diameter. Lay upon it a piece of fern leaf which has the sporangia just ripening (do not wait till the sori are old and shrivelled) and leave it in a sheltered place for a day or two, without wetting it. During this time the spores will be shed. Then take away the leaf, plunge the pot into water till the surface is quite moist, and put it in a place sheltered from direct sun. It is well to place a piece of glass over the pot, but the glass must be raised an inch or so above the rim, so as to allow access of air. The pot should be watered daily by plunging into water. After a few weeks a growth of tiny green prostrate plants will be seen; each of these will in time produce a fern plant. The first leaves are very small, but larger ones soon appear, and in about 3 or 4 months from sowing the spores it should be possible to transplant the young ferns. They should first be put into small pots, and then reported when they have made enough growth. It is possible in a year to produce moderate sized plants in this way. In any fern house there are always spores of the ferns blowing about in the air, and these spores will grow on sheltered walls or other suitable spots, from which the young plants may be taken and potted off, thus saving the trouble of sowing the spores specially. The sowing process is however necessary if one wants to grow particular species of ferns. Some kinds grow more easily than others from spores. One great difficulty is that foreign spores always blow in and invade the cultures, sometimes crowding out the particular plants it is desired to raise.

Pests.

The chief pest of maidenhair ferns in Malaya is a small scale insect. This is not usually serious on vigorous plants, but its attack should be watched for and prompt action taken. The most obvious sign of attack is the presence of tiny white objects, usually in groups on the leaflets. With them will be found small thin oval shaped brown scales; these are the sucking insects which do the damage. Old leaves which are badly attacked are best cut off and burnt; infested leaflets may be removed from younger fronds. In this way one can soon eliminate the pest from ones garden, but it will probably come in again from outside, and a constant watch should be kept. The large *Adiantum peruvianum* is sometimes attacked by a larger round scale. This is very obvious, and can be detached with the finger nail; again, in the case of a bad attack, the best plan is to cut off all the leaves and burn them.

In the next issue of this magazine descriptions and illustrations of the various kinds of Adiantum will be given.

HINTS ON THE USE OF FERTILISERS,

BY

A. R. WESTROP.

No. 1. Pot Plants.

The growth of plants in pots, which limit both the free spread of the roots and the quantity of soil available to provide plant food, is obviously a highly artificial form of cultivation. Even where a good potting compost has been used, the high temperature to which the soil in pots is exposed leads to rapid "nitrification" of organic matter and consequent loss in the drainage water of valuable plant food, the excessive watering to which plants are subjected in this country by inexperienced "Kebuns" contributing considerably to the loss. Hence poor growth, pale coloured leaves, small flowers and other signs of starvation are often common in pot plants.

Different families of plants require divergent types of soil and the preparation of suitable composts is outside the scope of this article. A rich, porous, well drained soil is, however, generally required and equal parts of well rotted cattle manure, leaf mould, sand and garden soil together with a little lime is a common recommendation in books on gardening. The latter generally recommend that such a compost should be sterilised by burning to get rid of fungus and insect pests, grass seeds etc., (in the case of tomato and zinnia cultivation such sterilisation is essential) and it must be recognised that such burning may destroy a large proportion of the valuable organic matter which the cattle manure and leaf mould is intended to supply. The most suitable method of replacing this and at the same time ensuring the correct balance of plant foods is to employ a suitable "artificial" fertiliser mixture containing organic matter in the potting composts after sterilisation. Such a mixture should contain a small proportion of immediately available plant food such as nitric nitrogen and water-soluble phosphoric acid combined with sulphate of ammonia or other less soluble chemicals to carry on the action and organic fertilisers such as Sterameal, blood meal, bone meal or oil cakes to produce a lasting effect.

For potting composts use 1 lb. of such a mixture to 1 bushel (8 gantangs) of soil. Trials in Malaya have shown that excellent growth of many plants can be obtained in composts in which artificial organic fertilisers have completely replaced both cattle manure and leaf mould.

In manuring pot plants it should be recognised that a concentration of plant foods, which would be beneficial in a garden bed, may cause the "burning" or even death of plants confined in pots and indeed the manufacturers of fertilisers have often much more trouble in preventing the murder of plants by the injudicious use of fertilisers than they have in securing striking results from their correct use.

A mixture containing organic matter, such as that mentioned above, is suitable for manuring most flowering plants, palms or shrubs in pots or tubs provided that it is used with moderation, a suitable quantity being a teaspoonful per 12 inch pot, smaller pots receiving less in proportion. A good method of application is to insert a hand-fork perpendicularly into the soil and to work it backward and forward at three or four points round the pot, thus producing cavities some 4 to 6 inches deep into which the fertiliser is shaken. This operation provides aeration without breaking or damaging the roots and avoids the concentration of the fertiliser, much of which remains on the sides of the cavities, in any one layer of the soil. A dressing of such an organic mixture should be repeated quarterly.

Whilst perennial plants thrive on fertilisers designed for lasting action, the quickly growing annuals benefit from more soluble manures. The soot-barrel or liquid-manure tub favoured in Europe for the top dressing of plants is frowned upon by the local Health Authorities and the use of readily-soluble chemical fertilisers is certainly an easier and more effective method of applying plant foods. Three of these in a complete form, i.e., supplying nitrogen, phosphoric acid and potash, can be obtained locally, viz Supram, Enpekay and Nitrophoska. The chemical should be dissolved in water, 1 oz. per gallon being the usual rate recommended, the pots being watered, preferably in the evening, with the solution instead of water once fortnightly or even weekly. These soluble chemical fertilisers form excellent "tonics" and shrubs on the point of blossoming may often be forced into flower by their use, an excellent example being the magnificent bouganvillea, exhibited at the last M.A.H.A. Exhibition, which had been treated with Supram.

A number of plants including the more delicate ferns and ground orchids will not tolerate chemical fertilisers even when applied in solution and for these organic fertilisers such as blood, bones, and Sterameal should be employed. A mixture which has been very successful locally with maidenhair and other ferns is:—

Blood Meal	7 parts		7 per cent Nitrogen.
Sterameal	4 ,,	analysing	10 per cent Phos. Acid.
Bone Meal	9 ,,		1 per cent Potash.
	20 parts		

This should be applied at the rate of one teaspoonful per large pot at monthly to quarterly intervals. The mixture may be forked in round the edges of the pot or simply sprinkled over the stems of the ferns. With this mixture there is no risk of an accidental overdose.

The same mixture should be used for gloxinias, begonias and other fleshy-leaved plants and whilst the effect of any fertiliser on the Epiphytic orchids is a matter of some doubt, a number of orchid-growers consider that the blood and bone mixture mentioned above does produce healthier plants and better blooms.

GARDEN PLANNING IN MALAYA,

BY

F. FLIPPANCE, F.R.H.S.

Assistant Curator, Botanic Gardens, Penang.

Introduction.

In order to awaken interest in garden design in this country, the following papers have been prepared. It is hoped that in some small measure, they may assist the keen amateur to lay out his garden more attractively, with a stricter adherence to the general principles underlying present day garden designs. By this means, it is hoped that a higher standard of garden will gradually replace the prevailing rather poor type of garden. It is realised that the question of cost enters largely into the matter and this will be borne in mind when some examples of garden designs are presented at a later stage. Another aspect which has a bearing on the subject is the temporary nature of residence in many instances. This is, undoubtedly, a great obstacle to the lively interest one would like to see exhibited. Even so there seems no valid reason why, once a garden is properly laid out, it should not be properly tended by successive tenants. The latter at least will have something to work upon. Further, there is in this country a large number of people whose residence is of a more permanent nature; these could do much to raise the standard of local gardens.

It is proposed, therefore, to publish a series of articles embracing as much of the subject as it is thought will be of interest. They will be especially applicable to this country. Gardens of various sizes will be dealt with, from the small plot to the large garden.

In this particular article it is intended to introduce the subject. The main principles underlying garden planning will be discussed, together with essential points which should be observed.

In garden planning at its best and in its correct application, when the site is chosen and the question of house and garden is considered, these latter are not treated as separate units, but rather as parts of a harmonious whole. In this way, the house and garden are built up together and generally the type of house and garden is decided by the immediate surroundings. Such a procedure is almost unheard of in Malaya. The usual practice is to build a house often with little regard to its immediate surroundings and later on think about the garden. The ideal method suggested above of dealing with the subject is quite out of the question for the person of limited means. The great majority of people are in the position of tenants in houses to which there are gardens already attached. It seldom falls to their lot to have the planning of an entirely new garden area. It is the hope that some assistance may be rendered to this class by the publication of these articles and that the keen amateur may find means of improving the appearance of his ready-made garden.

Origin of Modern Garden Design.

Garden design in the 18th century was of the formal type and had reached a stage where formality was carried to excess both in the general design and in the details of the plan. Intricate geometric designs were the ruling passion and the garden art of this period was largely a corollary of architecture. Towards the end of the century there was a breakway from this excessive formality and garden designs began to take on a more spontaneous and natural appearance. This, it is considered, was due to the awakening of a love for nature, largely engendered by writings and paintings.

It was at this time that landscape gardening began to be practised. Since that time the art has made such progress that it has become the universally accepted manner of treating large areas, such as parks, estates, etc, and has definitely become a profession in itself. It embodies not only a knowledge of plants and planting but of architecture, land surveying, drainage and other kindered subjects. Landscape gardening thus originated at a time when there was a surfeit of intense formality in garden design. It now embodies all that is best of the natural and spontaneous features of landscape, brought together and governed by definite principles.

Arising from the more natural treatment of large areas, a more natural type of design has been gradually evolved in gardens. At the present time gardens generally, whether large or small, show this influence. In large gardens, landscape gardening has been practised and designs have been executed giving landscape effects on a smaller scale. In small gardens, while it is not possible to utilise landscape designs, the underlying principles of such designs can be and are utilised. Thus, the present day small garden design is characterised by a combination of the formal and the informal. This has arisen by the intrusion of the natural treatment into the formal treatment of these gardens. The result is pleasing and the process can best be described as "informal formal" treatment.

Important Principles Underlying Modern Design.

The important principles are three in number and might be termed the three S's, for they are (i) Seclusion (ii) Spaciousness and (iii) Simplicity.

(i) Seclusion.

It is the aim of all modern garden designs to create an air of seclusion and to this end considerable attention is given to detail. It is not a difficult matter to obtain the desired effect when the garden is of ample dimensions, but it presents a much more difficult problem in the small garden. However, a good deal of seclusion is obtainable if the principles of landscape work are brought into use. By screening undesirable features of the immediate surroundings, by providing secluded corners which cannot be overlooked from neighbouring houses, by careful siting of trees and shrubs and by planting around the boundaries, much can be accomplished.

(ii) Spaciousness.

This is a principle which must be studied whether the design be for a park, a large garden or a small garden. It is obtained by adding to the available space an apparent extent which exists only in the imagination. Straight lines tend to emphasize the smallness of an area, particularly in that of a small garden. Therefore, to give an illusion of spaciousness border planting is often carried out in an irregular manner. Such planting gives an indefiniteness to the boundary lines, produces concealed corners and thereby an idea of hidden extents and in conjunction with careful planting, irregularity in shape of lawn, choice of colours, etc., produces the desired effect and creates this desirable feature which is so welcome in a small garden.

This quality is more easy of attainment in a garden of the undulating type for advantage may be taken of its irregularites. In the case of the flat garden it is only obtainable by carrying out the measures suggested above.

(iii) Simplicity.

It has already been stated that definite formal treatment of gardens is not advisable. Generally, something of an informal nature should be attempted. The formal garden can and does have a place in a garden of moderate dimensions, where it is fitted into the general design, but in such a case it covers but a small area of the actual site. It is generally found in conjunction with terraces, on an extended house line in a garden of undulating character. It is the type of garden which is better appreciated if seen from above. Simplicity should be the key note of general garden design. It is safer to deal with than the formal type and mistakes are more easily corrected. Wherever possible advantage should be taken of all natural amenities e.g. the natural irregularities of the site, views or vistas, specimen trees, the distant view of an interesting building, etc. Given a nice piece of lawn and carefully arranged borders and trees, it should not be difficult to provide a garden, simple in design yet very satisfying. Such simplicity of design is applicable to gardens of all sizes.

Types of Gardens.

(i) The Small Plot. (half acre or less)

A good deal may be done with the small plot. In cold climates such a garden is generally worked by the owner and his family. As a consequence, considerable improvements in design and beauty are met with, for it serves as a medium through which the owner is able to express his artistic sense and often this is of no mean order. Such gardens are stamped with individuality and it is not ordinarily possible to lay down hard or fast rules for their treatment, save to remember the principles mentioned above. In this country, such a garden is more likely to be tended by a part time kebun, but this should not deter the owner from designing it to his own satisfaction. He should be able to maintain an attractive garden, containing many interesting features, at small cost.

(ii) **The Small Garden.** (half to one acre)

This is the type of garden generally met with in this country. It is usually tended by one kebun. Full advantage of its possibilities are seldom taken and rarely is it made as attractive as it might be. The general principles of landscape work are more easily expressed in this type than in The Small Plot. These, however, have to be combined with a certain amount of formality and it is such a garden which can be made so delightfully informally formal.

(iii) **The Medium Garden.** (one to two acres)

This is probably one of the most interesting of modern types of gardens. After the general design and lay-out have been dealt with, it is sufficiently large to afford space for specialising. The owner is able to indulge any fancy he may have for any special type of plant or plant arrangement and generally does so. The result is that some charming gardens, complete in themselves, are to be found incorporated in the general design.

(iv) **The Large Garden.** (over two acres)

Gardens of this area are the exception rather than the rule in this country. Where they are in existence, they are seldom developed sufficiently to make them really attractive. Generally, the reason for this is the cost of upkeep. This could be kept at a reasonable figure, by devoting the outlying portions of the area, to trees, shrubs and a more or less wild garden. Once these are established the upkeep would consist chiefly of keeping the grass in order. An area immediately around the house should be developed as the garden proper. This type of garden affords scope for landscape work and in view of the rapidity of growth in this climate, the owner has a good opportunity of seeing the results of his labours. In contrast to such work in cold climates, where the results are often not apparent for three or four generations, this should be an incentive to people who have such areas at their disposal and the means to deal with them. In addition, there is space for the introduction of new and interesting plants, by means of which a valuable collection can be gradually built up.

(To be continued.)

LENGTH OF DAY AND THE FLOWERING OF PLANTS,

BY

R. E. HOLTTUM, M.A. (CANTAB,) F.L.S.

Director of Gardens S.S.

During the past few years a number of experiments have been carried out, both in Europe and America, on the influence of length of day on the growth and flowering of plants, and some very interesting results have been obtained. Some of these have a bearing on the behaviour of annual plants in the tropics, where the length of day is almost constant at about 12 hours throughout the year.

Briefly, it has been found that some plants will only produce flowers if they experience a length of day considerably in excess of 12 hours; others will only flower when the length of day is about 12 hours or less; still others are indifferent to the length of day, and will flower under any conditions. Tropical plants naturally belong to the second and third classes, but garden annuals introduced from temperate climates may belong to the first class and if so will be useless to us. Similarly, plants of the second class will not flower in the long days of the summer in temperate regions. It is only plants of the third class which will flower in temperate and tropical conditions alike. Some examples of these different classes are of interest.

An example of a long day plant is "golden glow" (*Rudbeckia laciniata*). Tests at Washington showed that this species required a day of at least 14 hours duration to produce flowers. Plants which received only 12 hours illumination each day only produced rosettes of leaves and no flowering shoots. I have tested this species in Singapore, and found that the plants soon produced healthy rosettes of leaves, but showed no signs of flowering. I kept them for more than six months, and at length one plant produced a very poor flowering shoot which bore two or three small flowers. Plants at Washington given 14.5 hours illumination each day produced flowers in less than two months. It is evident that here we have a plant which will grow quite well under local conditions, but is definitely prevented from flowering by the shortness of our days. If anyone cared to give some plants additional illumination each evening for two hours or so, he could make them flower. It would of course be necessary to find out by experiment the intensity of artificial light required. It is likely that there are a number of other similar cases. *Rudbeckia Newmanii* (Black-eyed Susan) flowers very freely in Malaya, so that allied plants may react differently to length of day.

Our common orange Cosmos, a native of Mexico, is an example of a short-day plant. If it is given more than 13.5 hours light each day it will not flower. Other examples of short-day plants are Tithonia and Poinsettia, and also the autumn flowering plants of temperate latitudes. Chrysanthemums, Golden rod, Michaelmas daisies and other plants are prevented from flowering in the long days of the summer months in the north, and during those months they are increasing in vegetative growth. Then when the shorter days of autumn come they produce their flowers. The same plants, if deprived of some part of the daylight during the summer, will flower prematurely, and they do the same in Malaya in our 12 hour days. Perhaps if we gave additional illumination daily for a couple of hours to our Michaelmas daisy plants they might attain to a larger size and stronger growth before flowering; the same would perhaps also apply to Dahlias, which flower so precociously and briefly under local lowland conditions. But our conditions of temperature and humidity have also to be reckoned with, and it is impossible to predict results without trial.

Examples of plants which are indifferent to the length of day are the tomato, the egg plant (brinjal), and Portulaca. These plants are tropical in origin, but they can be successfully grown in any latitude, provided they are given suitable temperatures. *Portulaca oleracea,* a common weed in Malaya and found throughout the tropics, has spread northwards into temperate climates, where the summer is long enough for it to flower and produce seeds. The plants are killed by frost in the autumn, the seeds surviving until next spring. It is clearly much more difficult for a short-day tropical plant to spread northwards (or southwards), as it has to wait for autumn before it can flower, and then frosts may come before its seeds have time to ripen.

From the above examples, it is evident that the daylight requirements of plants are important in many ways, and that they are definite limiting factors in our efforts at gardening in Malaya.

ARRANGING CUT FLOWERS,

BY

C. VAN DORT.

Although it is undoubtedly true that innate ability, imagination and much practice are necessary to produce the most artistic combination of flowers, any one can succeed in a measure if a few simple principles are observed.

Flowers, it must be remembered, bear a distinct relationship to the container in which they are placed. Let us therefore consider first the choice of a receptacle in which to place them. We have an endless variety of containers to select from, but whether we select a basket, earthenware pot, or a vase be assured that there is a flower which is its exact complement.

As it is the flowers and not the container we wish to display let us be guided in our choice by simplicity. There are many expensive vases which though very beautiful in themselves are for that very reason utterly unsuitable for the display of flowers. They are better used as ornaments than as receptacles for flowers.

Selection of Container.

In order that from the many containers at our disposal we select the one most suitable and appropriate for the particular flowers we wish to arrange, it is necessary to classify roughly both our flowers and their containers by texture. Thus we describe a silver vase as being fine, an earthenware pot as coarse, and a brass bowl as medium, in texture. Our flowers too can be said to have just as wide a range of texture. Zinnias, sunflowers, and marigolds would be called coarse, and therefore look best in an earthenware pot or basket; roses and orchids, the aristocrats of flowers, require silver vases and crystal or cut glass vases. It must, however, be understood that there are many grades of texture in each class and a certain amount of judgment must be exercised in the selection.

The next point to be considered is colour; harmony of colour between the container and the flowers. It is obvious that in an arrangement of flowers we wish the attention to be attracted and held by the flowers. Colour carries a feeling of weight, and dark colours are said to be heavier than light ones. By the law of gravity heavy masses are drawn to the bottom, and for that reason containers which are not transparent should be darker than the flowers. If we take a lesson from Nature, the great teacher, we find that she displays her floral beauties both rising from and against a background of grey-green, grey, or medium brown, and containers of those colours will usually be found most satisfactory. If foliage is used with the flowers, a green container of a darker shade than the foliage will be found pleasing. If foliage like that of the Coleus which suggests red is used, a brown or tan container is very effective. Some very fine results may be obtained by using containers which repeat the colour of the flower or foliage. Vases and bowls of foliage are now the vogue, and it is surprising that with the wealth of foliage available they are not used more

One of the main principles of art is repetition of line, and that is what is obtained in harmony of shape. Everyone has seen either an illustration or an actual arrangement of Iris in which a straight-sided vase, narrow at the top, is used to hold a few buds and leaves. The straight lines of the vase repeat the straight lines of the foliage and convey a good idea of what is meant by harmony of shape.

Arrangement of Flowers.

The commonest fault to be seen in the average arrangement is overcrowding. The beauty of each individual flower should be displayed. Individuality and naturalness of arrangement can only be obtained by eliminating the mass effect.

Symmetry is obviously the second commonest fault found in floral arrangements. When the halves of any floral arrangement are alike we have what is called symmetrical or formal balance; when they are balanced but unlike it is said to have informal balance. The latter is much harder to obtain. Balance in its strictest sense signifies repose.

Nature might well be taken as a guide in all floral arrangements. If one were to observe the growth and position of flowers growing wild, one would see that, although certain graduations in height from the front to the back are usually found, these graduations are not uniform. Taller spikes of flowers and plants are interspersed among the lower forms and introduce points of interest. A closer observation will reveal another of Nature's secrets and that is that the flowers themselves radiate from a centre.

The Japanese, who are masters of floral art, in arranging their flowers, have the principal flower or branch directly over the centre of the container; all others branch out from this central one but must be lower than the central one. In arranging bowls they take the highest point as being one and a half times the diameter of the bowl, and with vases have the tallest flower two and a half times the height of the vase.

In conclusion it is well to remember that the position in which the entire arrangement is placed, may utterly spoil the effect of the arrangement. As in music, a floral composition expresses an emotion or idea. Some seem to convey warmth and friendliness, others formal austerity; and if the note struck is gauged, harmony of environment is easily obtained. Unless the flowers used are of a trailing character, they should be placed below the level of the eye. They can be placed to be reflected in a mirror, or silhouetted against a wall, or framed against a window, but wherever they are placed be careful of your background, and do not have too many other objects around it.

Poultry & Pigeons.

THE LAHORE PIGEON,

BY

E. W. COOKE.

Among the many gems of the Pigeon Fancy, my favourites are the Lahores, for their beautiful contrast in marking; for their unusual expression; for their large size, and above all, for the joy with which they hail one's approach. The following remarks are offered from observations made in my loft. The Lahore is not very largely bred in this country, although it is one of the most charming of pigeons. I attribute this to its being of Indian origin and not well known locally.

Leading Traits of the Lahore.

HEAD —The forehead is high, and the skull widish.

EYES —Dark, with slight cere around, and that of a reddish tinge.

BEAK —Thick and wattle expansive, rather flattened, not rough, raised or wrinkled.

NECK —Rather short, the shoulders very wide and apparently powerful.

BODY —Large and rather heavy, the size being approximately that of a Carneaux.

LEGS —Short and the feet look strong.

COLOUR—The colours generally are blacks, browns and greys.

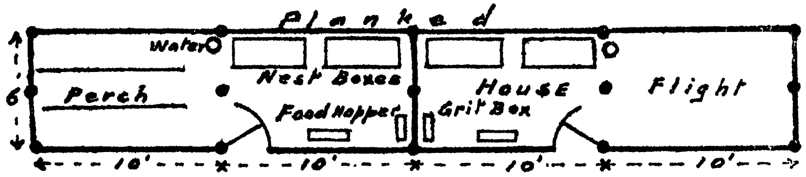
MARKINGS--In markings they are peculiar; the upper mandible of the beak is dark, the lower white. The whole of the upper part of head is black, running in a continuous line from the mouth to the back of the ear, and extending right down the back of neck, the division line of black and white being about midway of neck when the bird is viewed in profile; when seen from behind black, and in front white. The entire lower jaw right round the ear is white, front of neck, entire breast, belly, thighs, vent-covering, tail and back also pure white, thus leaving the entire wing and back coverts, or "saddle" jet black.

MANAGEMENT.

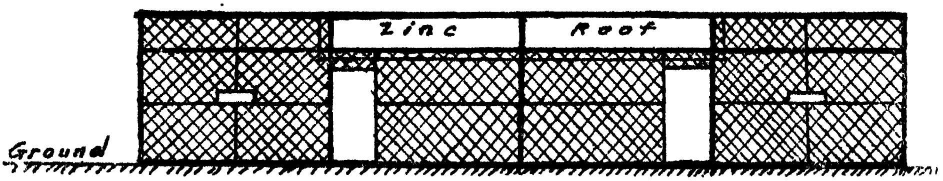
Housing.

Of pigeon houses, there are designs innumerable, but some of them, such as the cote on the top of a pole, and the artistic three decker arrangements, are not suitable for breeding birds for exhibition purposes. It is difficult to keep such houses in a sanitary condition, and they are more adapted to breeding vermin than high class pigeons. In a pigeon house there are three essentials needed—the house should be damp-proof, draught proof and well ventilated. The plan and sections included in this article will sufficiently explain the ideas of how a house should be built. Lofts have been built

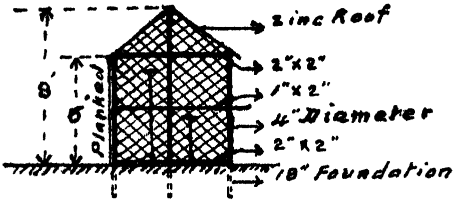
Double Loft with Flights.



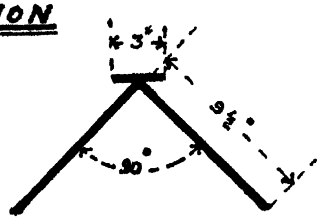
PLAN



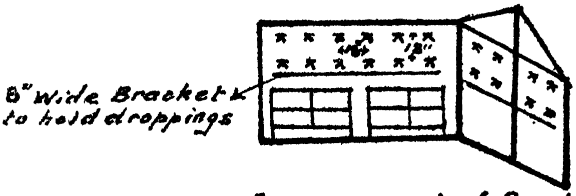
SECTION



CROSS-SECTION



Perch Constructed of ¾" Planks



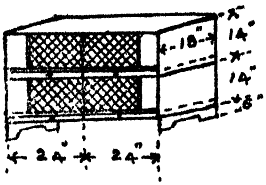
Arrangement of Perches

Cost of Double Loft

App: $30·00

Fig: 1

Mating Pen & Nest box.

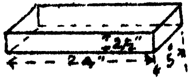


Made of 6"×½" Planks

App: Cost $3·50

Fig: 2.

Food Hopper

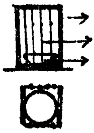


Made of 6"×½" Planks

App. Cost -/50

Fig: 3

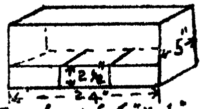
Fountain



App: Cost -/50

Fig: 4

Salt, Lime & Charcoal Box

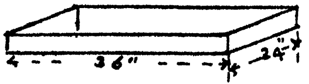


Made of 6"×½" Planks

App: Cost $2·50

Fig: 5

Bath



Made of Zinc with edges wired

App: Cost $2·50

to this plan and have proved successful. It shows a double loft with "flights," which is indispensable. One loft to be used for the old birds and the other for the young. Then, again, it is a great advantage to be able to separate the sexes for a couple of months yearly, for the following reasons:—

(1) To give the birds a rest from the strain of parental duties.

(2) When afforded a rest before a show they keep clean, for when feeding the squabs they are apt to dirty their breasts, particularly the Lahores being white breasted; and then again they are all anxious to mate, and the cocks in a show pen exhibit themselves to better advantage if a hen is in view. A further advantage of a double loft is that two varieties of pigeons could be kept. When the time for separation comes the cocks could be put in one loft and the hens in the other. The opinion is held that it is not essential to have the young pigeons separated.

Nest Boxes

The boxes are designed to serve a two-fold purpose; that is as a combined mating-pen, as well as a next-box. Figure 1 gives details for the making of one. The boxes are in sections of four, so that they can be removed from the loft when the time for separating the sexes arrives. It will be seen that each box has a drawer which can be taken out, cleaned and sunned, whenever required. Lahores do very well when mated in these boxes and allowed to build their nest in the same box. The method to be adopted is to decide the pair to be mated; place them in the box and shut them up for a week, by which time they will have mated. The birds are then set at liberty in the loft where dry lallang or straw should be scattered in the "flight." They will then build their nest in the boxes in which they were mated. In about ten days from mating, they will lay; then the door of the box should be closed every night to prevent rats getting at the eggs or very young squabs. The eggs are hatched in 18 days from the laying of the second egg.

Food.

My birds are fed twice a day at 6. a.m., and at 4.30 p.m., with food recommended to me by Mr. H. Richmond, one of the leading fanciers of the country. It consists of six gantangs of paddy, one of green gram and one of rice. The food is given in a wooden tray, as shown in figure 2, and only enough should be given to satisfy the birds, so that none is left to get contaminated by their feet or droppings, one of the sources, by the way of diarrhoea and roup. When the meal is over the tray should be removed or turned over to keep it clean and in readiness for the next meal.

Care should be taken in preparing the food that the paddy, green gram, and rice should be well sunned and winnowed to remove dust, of which it may be remarked, in passing, that there is not a little, and other particles of dirt, particularly in the paddy and green gram. When this is done, mix well. The food should be put in a box, covered up and kept in a dry place, for the two chief dangers which must be avoided are dampness, and attacks of vermin such as rats. Dampness is fatal for the reason that damp grain is liable to become musty and mildewed. Rats are well-known for their depredations where food-stuff such as paddy, is concerned.

Water.

Drinking water should be changed twice a day and should not be allowed to get stale and stagnant, nor to get dirty, or fouled by dust and droppings. It should also be protected from the sun's rays, so a sheltered position should be selected. Figure 3 is a sketch of a fountain with a note regarding its construction. Impure water is the root of many pigeon ailments.

Salt, Grit, and Lime.

Closely connected with the food question is that of other substances eaten by pigeons, such as salt, grit and those of a lime formation.

Salt is a necessity as it is a digestive and the birds themselves are very fond of it. The writer's birds are given the grainy salt that is sold in the local shops.

Grit is more of an absolute necessity in the digestion of food than salt. Its duty is to grind up the food, and it takes the place of teeth in other animals. It can be supplied by means of coarse sand or fine gravel, but it should consist of the sharp cut and not of the round wave-smoothed kinds.

Lime is important for it assists the hens in preparing the matter with which to shell their eggs. To the young birds it provides what is required for bone and feather formation. Another substance that is essential is charcoal finely broken up. Figure 4 is a sketch of a box for the reception of salt, lime and charcoal.

Bath.

If pigeons are to be kept in good health they should be allowed to bathe freely. One of the first symptoms of a bird being out of sorts is a refusal to bathe. Birds which do not bathe should be examined and watched. Details of the form of the bath favoured by the writer is sketched in Figure 5.

The bath should be removed as soon as the birds have finished their ablutions. If this is not done some may drink from the bath and thus introduce dirt into their systems.

Mating.

This is the most interesting part of a fancier's endeavours. To mate a pair of birds on points and then see in the squabs whether your judgment is correct is a very facinating feature. The greater the knowledge of the birds you are mating the greater the success. It is therefore essential to keep careful records of matings with their results. The main point is so to mate the birds that the faults in one are counteracted by a close approach to the standard in the other, having in mind the maxim, that "Like begets like."

Young Birds.

As you find the birds mature, make a point of killing off all wasters—that is, any which will obviously be no good either for show or stock; it is useless crowding the loft with them. Whereas good birds will always command their price, second rate birds are practically unsaleable. The latter certainly will be well-favoured for a pigeon pie, and particularly Lahores when squabs at the age of six to eight weeks make good eating; they often weigh about a pound when a month old.

Shedding of Nest Feathers.

Shedding of the nest feathers is rather a trying process for the young birds. They must be well fed at this period, and a sharp look-out kept for any that show "going light." Such birds will be off their feed, mope in a corner, and have a dull eye, and ruffled plumage.

Ringing.

All birds likely to turn out well must be ringed when about 12 days old, with a standard size ring, for the following reasons:—(1) Because they are otherwise ineligible to compete at Exhibitions in the young class of their year and (2) for the purpose of identification. Rings are very cheap. They can be obtained for use in the coming year from Messrs. Atherton, Dodd and Loxley, 100, Evering Road, Stoke Newington, London, N. 16. The prices of the rings are as follows:—

year only			3/-	per 100
year end numbers consecutively			4/-	,,
one letter year and number			4/6	,,
two	do	do	5/-	,,
three	do	do	5/6	,,
four	do	do	6/-	,,

When placing an indent for rings the year and the size should be given.

The N.P.A. standed ring for racing Homers is suitable for Pigmy Pouters, Modenas, Tumblers and Mookees.

For Lahores, a bigger ring is required and the N.P.A. size for Carneaux will answer the purpose.

Diseases.

A good preventative of disease is as follows:—Sulphate of soda 2 oz., Alum 1 oz, ordinary table salt 2 oz. Dissolve in 2 pints of boiling water and dilute a part of this mixture in four pints of drinking water to be given once a week.

A number of birds who were moping and showed signs of loss of appetite have been cured by giving them garlic well smashed and made to a pill of about ¼ inch diameter twice a day, early in the morning and late in the evening. The pills also cured young birds "going light."

General.

It is advisable to keep a register of pigeons and careful notes of breeding results. Most keen fanciers prefer to have details of the birds they buy. The forms shown below may be useful.

Register of Pigeons.

Ring		Sex		Colour	Parents		Ref. to Breeding	How Disposed	Remarks.
Year	No.	Cock	Hen		Sire	Dam			

Breeding Records.

Sire.................................

Dam.................................

Date Laid	Date Hatched	Ring No. of Squab	Ref. to Register	Remarks

The Lahore was first exhibited by me in the M.A.H.A. Show (Taiping Branch) in 1926 in the "Any other Variety" class. The bird exhibited was a brown cock, which was placed third. They have since been exhibited each year in the same class with the exception of this year, when the Lahores and Mookees were allotted a special class as the result of a suggestion made by the writer, and it is to be hoped that this class will be productive of very keen competition in the coming years. If anyone wishes to have a real fancy and utility pigeon, the Lahore is to be strongly commended.

RICKETS IN CHICKENS CAUSED BY VITAMIN D DEFICIENCY,

BY

J. K. HUTCHISON, B.V.SC., *Veterinary Research Officer.*

RICKETS is a disease occurring in chickens, and is caused by a deficiency in the diet of vitamin D, a food factor necessary for proper formation of bone. This deficiency leads to softness of the bones, resulting in weakness, crippled limbs, debility and death.

Why the Disease Occurs.

It is known that there are present in foodstuffs certain factors called vitamins which are necessary for life or proper body development. Different foods vary in their vitamin content, some being rich in one vitamin and deficient in another and *vice versa.* Vitamin D is present in certain animal products, notably cod liver oil, milk and eggs, and is unique in that it can be supplied also by certain active rays of the sun (ultra-violet rays).

As this vitamin is necessary for the minerals in the food to be converted into bone, its absence (either in the food or from lack of sunshine) results in the bones not developing properly, being soft and incapable of supporting the weight of the chick. The ultra-violet rays do not penetrate ordinary window glass, so that chickens whose only source of sunlight is through window glass are liable to show rickets if the ration is deficient in vitamin D.

Age of Birds Affected.

Under conditions prevailing in the poultry industry of Australia, rickets is likely to be seen only in chickens in the first few weeks of life, particularly in the brooding period. Normally the egg contains a supply of this vitamin sufficient to provide the growing chick until it gathers supplies itself either from the food or sunshine, *i.e.,* for about a week or ten days. In chickens from normal eggs, but on a deficient ration and away from sunlight, rickets appears in from eleven to fourteen days.

If, however, owing to lack of the vitamin supply in the laying hens, the eggs are deficient in the vitamin, it follows that the chicks will be unprovided with vitamin from hatching. Under these circumstances, rickets may appear as early as two days after hatching.

Symptoms and Post-mortem Appearance.

Symptoms.—It is usual for a number of chicks to show symptoms simultaneously. The first sign is that an affected chick is noticed to be unsteady on its legs. When disturbed, it runs with a stiff "wabbly" gait, comes to a sudden stop, drops its tail and has a dejected appearance. The

(Reprinted, without photographs, from "The Agricultural Gazette of New South Wales" October, 1932.)

appetite is usually unaffected until late in the disease, but many chicks find difficulty in eating owing to softening of the beak and the bones of the head. The beaks are often held open after eating and remain so until death. In some cases the softening of the beaks becomes very pronounced, with the beaks actually crossing and curling over each other.

As the disease progresses the chicks become more dejected, and stand with wings and tail dropped, feathers ruffled, head down, and eyes closed. The body often sways backwards and forwards, so that the head comes nearer and nearer the ground, and finally the chick topples over on its head. Frequently the chicks suddenly run backwards, particularly if disturbed. The leg-weakness increases until the birds are unable to stand for long, and they lie down on their sides or breasts, rising only if disturbed. When lying down they sometimes have one leg extended forward and the other backward. Finally the chicks are unable to rise and death occurs in a few hours.

A prominent feature of rickets and one which distinguishes it from other chicken diseases is that the chicks are usually sick from two to three days, whereas in other diseases a sick chick rarely survives twenty-four hours after showing symptoms. This feature, coupled with the softness of the bones and of the beaks are most prominent characteristics of rickets.

Post-mortem Appearance.—The ribs are usually distorted and nodular, and the breast-bone shows varying degrees of distortion ("crooked breast").

The long bones of the legs and wings are soft, and may be readily bent without breaking. They are easily cut with a knife or even with the finger nails.

Treatment.

Chicks affected with rickets should be immediately given an ample supply of the vitamin, either in the form of direct sunlight or as cod liver oil, and good results may be expected from such treatment. Whether the treatment is exposure to direct sunlight or the administration of cod liver oil, an initial dosing of all chicks should be undertaken, giving each chick four drops of cod liver oil by means of a dropper.

Where chicks cannot be run in the sunlight during the warm hours of the day, as in the case of chicks in battery brooders, pure cod liver oil should be provided at the rate of 4 per cent. added daily to the mash until the disease has disappeared, when the amount of cod liver oil may be reduced to 2 per cent.

It must be borne in mind that, for reasons already stated, exposure of chicks to the light which penetrates ordinary window glass does not provide the chicks with a source of the necessary vitamin.

The presence of minerals in the ration of chickens is equally as essential as that of vitamins for normal bone formation. All rations should contain bone meal at the rate of 1 per cent., but in cases where rickets has made its appearance this amount should be increased to 2 per cent. until all signs of the deficiency disease have passed, when the smaller amount may be reverted to.

Prevention.

Prevention is on similar lines to treatment. It is primarily of importance that the breeding stock should be provided either with direct sunlight or with from 1 to 2 per cent. of pure cod liver oil in the mash. The vitamin is then supplied in the eggs.

When one week old, chicks not in battery brooders should be allowed to run for at least one hour daily in warm sunlit pens adjacent to the brooder house. Especial care should be taken to see that chicks in battery brooders, or where exposure to sunlight is not practicable, should be provided with 2 per cent. of pure cod liver oil in the mash. It is preferable to add the cod liver oil to the mash daily.

As ordinary window glass filters out the essential sun rays, a special type of glass which admits the rays is at times employed. It is rather expensive, and other glass substitutes of the fabric type, which are claimed to be satisfactory, are sometimes used.

Egg-isms.

Two tons of grain will produce 480 dozen of eggs.

An egg is 66 per cent. water, 13 per cent. protein, 10 per cent. fat and 11 per cent. lime or ash.

In an egg 60 per cent. is white, 30 per cent. yolk and 10 per cent. shell.

The best eggs of the year are those laid in the months of April, May and June.

An egg eaten between September and March is worth more to the average person in a Northern climate than one eaten between April and August.

Eggs and milk together are liquid meat in the most digestive and assimilable form.

An egg weighing two ounces holds approximately 70 calories in fuel value.

The egg is aptly termed "bottled sunshine." It is rich in proteins, vitamines and minerals.

Of the five vitamines the egg supplies Vitamine A, B, D and E. It is particularly rich in "D," the sunshine vitamine. (*The Livestock Journal*).

DUCKS BRING PROFIT TO FARMERS.

Did you ever wonder whether there is money in raising ducks? Would you like to try it? If you are seriously thinking about it, there are some points that should receive careful thought.

Ducks need water. The amount of water depends on what you intend to do with them. Ducklings that are intended to be marketed in eight to ten weeks need never swim. All they need is drinking water, deep enough to cover the bill, nostril and eyes. This much they must have.

But if you intend to breed ducks, it is a different matter. Breeding work can be carried on with no more water than is required for ducklings. But if vigour and health are to be maintained over a period of years, "Swimming water" is imperative.

If you intend to produce your own hatching eggs and make duck farming a permanent business, you should select a farm that has running water or a clean pond. The land should have a gradual slope, preferably to the south. A light gravelly or sandy soil is best.

The next question has to do with the desired breed. If you want to sell ducks as food—and that is still the chief function of duck farms—you should select one of the heavy breeds, such as the Rouen, Aylesbury, or White Pekin. If you want eggs, there is nothing better than the Indian Runner.

Three Favourite Types.

Those people who desire to eat mature ducks only will find Rouens delicious and as cheap as any duck grown.

The Aylesbury is light in bone, and has a frame well covered with white flesh. The breast is especially well covered. The ducks are good layers, sometimes laying 80 or 90 eggs without a break. If hatched early and well reared, they will start laying about October 1. Flocks have been known to average 150 eggs each. The eggs are greenish-white.

The White Pekin is a native of China. It resembles the Aylesbury, except that the body is a little longer and the head a little coarser. The colour of the flesh and skin is yellow instead of white. The colour of the legs and feet is redish-orange, whereas the colour of the Aylesbury is bright orange.

No Expensive Houses.

Now ducks do not require expensive houses. Shed roof buildings, with just enough head room for the caretaker, will do for the breeders. No floor is necessary. The building may be from 16 to 20 ft. deep. It may face south. Three sides should be light, almost air-tight. The front, except for 2 ft. at the bottom, should be covered only with wire netting.

Printed from "The Live Stock Journal" September, 1932.

Ducks need more air than chickens. A 2 by 4 on edge on the floor, 20 in. from the wall, will provide space for nests when filled with shavings or clean straw. Allow 4 sq. ft. of floor space per duck. Some people insist on 8 ft.

Type to Select.

Then, having decided on the breed, the next thing is the type of stock to select. On this depends the success or failure of the project.

Ducklings, intended for breeding purposes, should be raised with that end in view. They should never be placed on a fattening mash. It is a wise procedure to pick the most likely ducks, and a more limited number of the most drakes, when they are from five to six weeks of age, and continue them on the growing mash until they are seven to eight months old. They should be rigidly culled at ten weeks for defects, such as crooked backs, twisted wings, black feathers, wry tails, etc. The culls can then be fattened for market.

Ducks should never be fed a sloppy mash. They should always have mash in preference to grain. They should never have more than they will clean up in 15 to 20 minutes. Breeders should be fed twice a day, a light feed in the morning, what they will clean up in 10 minutes, and a heavy feed at night, what they will clean up in 20 minutes. Small flocks of breeders, on free, open ranges, need not be fed at all in the morning. So writes W. D. Buchanan in the *Oregon Farmer*.

Pigs.

THE NEED FOR REGISTRATION,

BY

W. LEGGATT.

The question of improving the breed of pigs in this country connotes the perpetuation of the strain of such pure bred pigs as are now here, to effect which a system of registration is necessary.

One of the first duties of a society such as is envisaged will be to establish a register for this purpose, but in the meantime it may not be out of place to explain why registration is important.

It is a well known fact that in animal breeding the characteristics of the sire dominate those of the dam, and accordingly in pig breeding, particularly when it is desirous to improve quickly the strain of a large number of inferior pigs, it is vital that the breed of the boars used should be above reproach. Now, if an inferior sow or gilt is served by a pure bred boar, the resultant litter will contain a percentage of piglets, which to all appearance are identically of the same breed as their sire. But inherently they are not, and if a boar of this litter is used in its turn to cross another inferior sow or gilt the result is likely to be extremely disappointing to the breeder. Without registration there is no guarantee, and an unscrupulous dealer may sell as pure bred, pigs only a half or quarter bred, and although admittedly even a little good blood however diluted is to be preferred to the present so-called Native pig, yet such action unchecked must inevitably frustrate any attempt in a big way to improve the strain.

There are practical difficulties in the way of starting a Pig Register in this country, not the least of which is the fact that there are actually few, very few, pigs out here carrying the hall mark of a pedigree issued by the National Pig Breeders Association, but similar difficulties have been met and overcome by other local breeding associations, and there is no reason why they should be beyond the powers of a society of intelligent pig breeders.

PROPOSED SCHEME OF PIG REGISTRATION.

The following is a very brief outline of a scheme for registration of Pigs, and as indicated in the above article, it is particularly advisable that some system of registration should be adopted in Malaya.

It is suggested that a Malayan Pig Breeders Association should be formed under the auspices of and affiliated to the Malayan Agri-Horticultural

Association, and this body would be responsible for the issue of certificates of registration.

Registration would have to be effected within twenty-eight days of birth and a small fee would be payable. Qualification for registration would be proof that Sire and Dam were progeny of pure bred pigs and any question of eligibility would be decided by the Association.

It is hoped that pig breeders will give the scheme their support and those interested are asked to communicate in the first place with the Secretary, The Malayan Agri-Horticultural Association, 12, Barrack Road, Kuala Lumpur.

AN EFFECTIVE RAT TRAP.

One of the best methods of trapping rats is to get a small barrel or a water-tight chest and fill it rather more than half full of water. Over the top, spread a sack or piece of canvas, having a hole in the middle large enough to admit a full grown rat. Fasten it down taut all round. Spread a fairly thick layer of cork or chaff or both, on the top of the water and suspend a lump of cheese, meat or a piece of fish from under the sacking or canvas and just to be out of reach of the rats. The stronger the scent of the bait the better. Scatter a handful of loose straw or hay on top of the box or barrel and place a board against it so that the rats may readily find their way to the top. The barrel, it need hardly be said, should stand in a shady corner near where the rats have their burrows or run. See that they are not disturbed by cats. A little bait on the top of the trap vessel will naturally induce them to search for more, and scenting the feast within the vessel, they will plunge to their doom one after another. As many as thirty-eight rats have been trapped this way during a single night. Rats can swim of course, but with the surface of the water within the barrel about a foot from the top, they are unable to jump out, and soon drown. *Journal of the Jamaica Agricultural Society.*

Miscellaneous.

FILM PROPAGANDA IN MALAYA,

BY

L. D. GAMMANS, M.C.S ,

Asst. Director of Co-operation, F. M. S. & S. S.

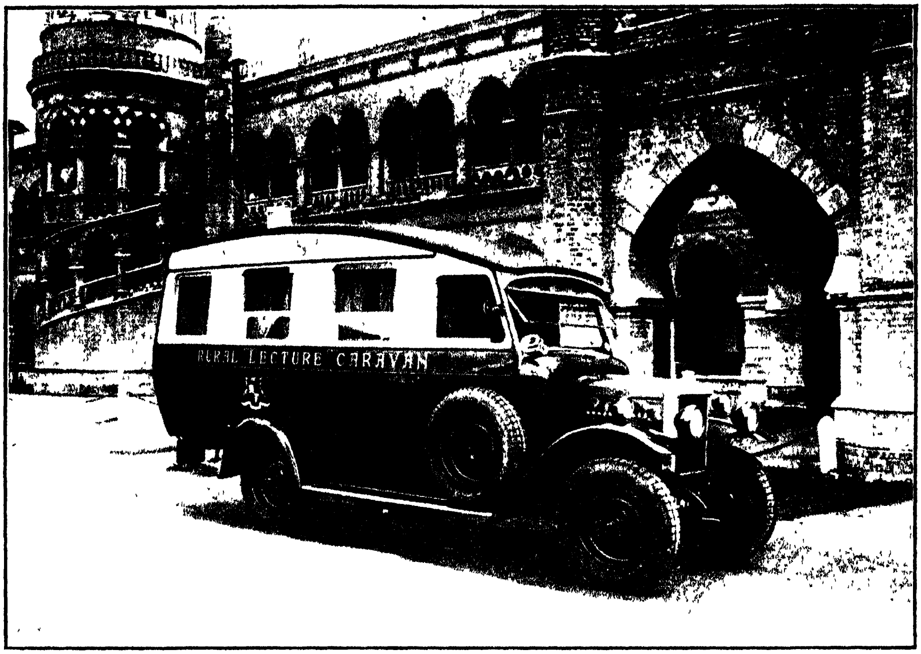
British Colonial policy in its early stages chiefly confined its activities to the maintenance of order, the provision of justice and to administrative matters generally. Of recent years the importance of assisting the economic development of the peoples for whom we have assumed responsibility, has been more and more realised. Colonial Governments have been called upon to perform functions which in countries in a more advanced state of development, are left to public bodies or private enterprise. New departments of Government have been started which can be classified for the want of a better name under the heading of "Nation Building." Such departments include the Agricultural Department, Co-operative Societies Department, Education Department, Veterinary Department, and those functions of the Medical Department which relate to rural sanitation, infant welfare and public health generally.

One of the chief problems which face these departments is the method by which they can impart to the native population generally the information at their disposal. The task is not an easy one. First of all their interest must be aroused. They must be made "problem-conscious." A dissatisfaction with things as they are must be awakened. A determination to adopt better methods must be aroused. Only when all this has been done can results be expected from the impartation of definite knowledge as to the methods by which improvement is possible.

During the past two or three years interesting experiments have been carried out in the Federated Malay States and Straits Settlements with cinema propaganda. The Medical Department has produced films dealing with infant welfare and rural sanitation, which have been exhibited in many parts of the country. The Agricultural Department, the Co-operative Societies Department and the Rubber Research Institute are all departments whose efforts need the closest possible correlation with each other. A Committee known as the Film Propaganda Committee has been formed to secure this co-operation so far as film propaganda is concerned.

The Rural Lecture Caravan.

The Committee operates jointly a Rural Lecture Caravan. This caravan which has been fitted up with some ingenuity, consists of living accommodation for the film operator and the driver, and large cupboards for the storage of agricultural exhibits. The whole is mounted on a 30 cwt. Morris lorry chassis. The power required to work the cinema apparatus is


RURAL LECTURE CARAVAN

98

generated by a 1½—2 H.P. Blackstone petrol engine geared direct to a 110 volt. 1.25 k.w. dynamo with voltage regulator. This unit is mounted on a wooden base plate and can be removed from the caravan for use in school buildings or on house boats up and down the rivers.

The type of film used is the 16 mm. variety. This size of film is of course less suited for large audiences, especially in the open air, than standard film, but it is much cheaper and the cost of cameras, projectors and the necessary apparatus is correspondingly less. It also has the advantage that it can be processed locally. A considerably larger image is projected than is normally aimed at for 16 mm. film. The result, however, has been found to be quite satisfactory provided that moonlight nights are avoided and care is taken to set up the screen with the minimum interference from the lights of passing traffic.

Choice of Subject.

The provision of suitable films has been the chief difficulty. Imported films from Europe or America are of little use, since they cannot hope to deal with local conditions or offer a solution for local problems. The films shown must deal with the every day life of the peasant. Every effort must be made to avoid mistakes in detail, and it has been found that correct psychology is of more importance than technical excellence in production. Each film aims at dealing with one particular theme, and wherever possible the subject is dramatised. The method of treating different subjects is very similar, and generally means showing a distinct contrast between the right and the wrong ways of doing things. The result is very similar to the old Victorian drama. Virtue must be labelled white from the beginning, and its opposite black. The pale shades of grey which are a feature of present day standards of morality must be avoided. The lesson which the film is trying to teach, must be clear and unmistakable. Captions are inserted in the vernacular, but the producer should aim at making the lesson so clear that the film will be readily understood by the illiterate with the minimum of verbal explanation.

Films Produced in Malaya.

One example will illustrate the general method. The Co-operative Societies Department has during the past few years started simple co-operative societies to encourage thrift amongst the Indian labourers employed on rubber estates or by Government departments. The aim is to encourage the labourer not to fritter away his earnings and to enable him to save money for the time when he returns to India. A film dealing with this subject has been prepared. The scene opens in India with two labourers bidding farewell to their parents as they set off to seek their fortune in Malaya. The manager of the estate where they are working advises them to join the co-operative society. One does so, and in the course of years accommodates sufficient money to purchase cattle, send home family remittances, and eventually to return to India. The other man refuses to join and his subsequent career becomes a sort of rake's progress, which finally lands him in gaol. The final stage of both men is vividly contrasted, and the audience are asked which path they themselves

propose to follow.

The Agricultural Department has produced a film dealing with rice cultivation. It aims firstly at encouraging more padi growing so as to make Malaya less dependent upon imported foodstuff, and in addition shows what is being done towards the improvement in padi cultivation. Its theme may be said to be "More and Better Padi." The Co-operative Societies Department has in addition two films for Malay audiences. One deals with the general problem of thrift and extravagance and illustrates the functions of rural co-operative credit societies in rural economic life, and the other shows what is possible by co-operative methods in the production and marketing of small holders' rubber. At the present time another film is in course of preparation stressing the importance of the peasant making himself independent on foodstuffs.

The films have been written and produced by the officers of the two departments without any previous technical experience in film production. The characters in the dramas are Government officers and ordinary village people although in a few instances professional actors from travelling Malay companies have been taken on for "star" parts. It is found that simple village people will act quite naturally provided they are sympathetically handled and not worried. It is better to be liberal with the use of the editing scissors than to attempt to work up an artificial studio atmosphere.

The caravan has been touring the country for the past two years under the direction of the local Agricultural Field Officers with the sympathetic assistance of the district administrative officers. The normal procedure is for the caravan to arrive in a village during the morning. The various agricultural exhibits are set out, and lectures are given on subjects of local agricultural interest. After dark such films are shown as have a local application.

Results.

It is as yet too early to be dogmatic as to the results. Almost invariably large audiences have been drawn together and people have been attracted from miles around. An estimated attendance of between 2,000 and 3,000 people is not as uncommon experience. The number of questions asked after the performances is extremely gratifying, and numerous applications for information on improved methods of cultivation have been received while a large number of orders for planting material of improved strains of padi and other things have been placed with the Agricultural Department. It is fully recognised that film propaganda in itself is not all that is required. Detailed instruction by the various technical officers of the different departments concerned must be given. It can be claimed, however, that the cinema draws the people together, presents to them the problems which face them in general terms, shows them that better methods of doing things are possible, and provides that general foundation without which detailed instruction often proves so disappointing in results.

GOAT-KEEPING AS A SIDE LINE,

BY

T. MURARI, B.Sc. (OXON.), F.L.S

Superintendent, Livestock Research Station, Hosur.

The goat has been associated with man for ages. In some parts of the world man has made use of the goat to the best advantage. In Kashmere the goat yields hair for textile purposes, milk and skin. The Angora goat is equally important. In Europe there are several well-known breeds like the Toggenburg, Anglo-Swiss and the Nubian, and English goats owe their improvement somewhat to the introduction of superior goats from this country. Goat-keeping became recognised in England and the goats competed for the first time in the Crystal Palace Show in 1875 and in the Dairy Show the following year. At present there is the British Goat Society which looks to the welfare of the goat industry.

In this Presidency it is a common sight to see goats grazing in flocks by roadsides and fields, including private gardens, without the permission of the owner. The ryots and the nomadic classes keep goats mainly for their manure and milk, if available, and flesh. There are various types of goats found in different parts of the Presidency and most of them are variegated in colour, brown or black or white being quite common. Size varies considerably depending on locality. As a rule their milk yield is not appreciable and they are a nuisance to forest authorities and a source of danger to vegetation of all kinds. It must be mentioned in this connection that the Muslim community take to goat keeping but as a rule they do not control their grazing.

There is a short wedge-shaped variety in and about Coimbatore which is often called *Velladu.* They have good udders but the milk is not of commercial value as it is said that it is not healthy. The milk yield, however, is not as heavy as that from goats in the West Coast kept mainly by the Moplah community. It would however, be worth while investigating the quality of milk from this variety in Coimbatore.

Goat-keeping is an important industry in the West Coast, especially in and near Tellicherry and Badagara. It is stated that the origin is mainly traceable to the introduction of goats by the Arab traders in the past, which is now quite historic. In these it would appear that the Surat or Scindhe variety has been introduced, but there is no sign of the fleshy-eared type in the flocks. The goats are very mixed in character, and their conformation is of the dairy type with good udders. The size, however, seems to have suffered—perhaps not as much as the cattle—probably due to in-breeding and mineral deficiency which is likely to occur due to leaching and washing out in the West Coast.

(Reprinted from "Agriculture and Livestock in India", May, 1932.)

The goat milk is an important food. It is richer than the cows' milk and the fat globules being smaller, is easily digestible. The goat is generally considered to be immune to tuberculosis and its milk is a very useful article of diet to invalids and children. The goat's milk as an article of diet seems to be well appreciated in the West Coast.

The milch goats are stall-fed. They generally get 1 lb. coconut cake, 1 lb. gingelly cake given in two feeds and leaves of Jack fruit trees *ad lib* An addition of ½ oz. of lime and bone meal per animal would be useful, but this is not usually given. The economic conditions have become such that leaves are sold by women from 4 to 12 annas a head load. According to one of the goat-keepers, he estimated cost of feeding at 12 annas per day and clean profit of 6 annas per day. The price of milch goats vary from Rs. 15 to Rs. 25.

That it is a profitable concern will be recognised when one sees the enormous number of coffee shops in the West Coast in particular. The milch goat gives in the cases noted by the author 2 bottles or more at a time, twice a day. Taking each bottle to contain 20 oz. the daily average works out to 80 oz., *i.e.*, 4 lb. 4 oz. The lactation lasts 4 months and there are two lactations in the case of intensive goat-keeping which means about 1,000 lb. a year. In addition to milking, the goat is very prolific. It kids twice a year and very often triplets are born. The author has seen a case of five kids in one kidding. Even at an average of twins at each kidding, it is a commercial proposition.

The housing is very simple. Any roomy shed with pegs for tethering is sufficient. In the West Coast and South Kanara some sheds are built high above the ground so as to keep them dry during rainy seasons. It is unfortunate that the he-goats are not separated from the she-goats; the result is that there is promiscuous crossing. The goats are generally overcrowded. If this is avoided, pregnant animals will not be molested by others and cases of abortion will be reduced.

If the milch goats are well-housed, fed properly and the kids taken care of, there is no doubt that milch goat keeping should be a paying concern throughout the Presidency wherever there is a ready market for goats' milk and its products.

District Notes.

DISTRICT AGRICULTURAL SHOW AT KUALA SELANGOR ON 10th NOVEMBER, 1932.

A District Agricultural Show was held in the Government Office buildings Kuala Selangor, on 10th November under the auspices of the Malayan Agri-Horticultural Association.

The exhibition was opened by His Highness the Sultan of Selangor, the opening ceremony being attended by the Hon'ble the British Resident, Selangor, the District Officer, Kuala Selangor (Mr. A. T. Newboult) the President M.A.H.A. (Mr. Douglas) and a number of Government Officers from the Agricultural, Co-operative and Health Departments, and a large number of local Malays.

After declaring the exhibition open, His Highness the Sultan accompanied by the Raja Muda, the Hon'ble the British Resident and the District Officer, Kuala Selangor, made a tour of the whole exhibition. The Sultan showed considerable interest in all sections, but especially in the exhibits of coconut oil, and in the exhibit of copra staged by the Agricultural Department.

Under the Agricultural Section, the fruit and vegetable classes were well supported and the quality of the exhibits in many cases reached quite a high standard. The padi class, although small, reached a high standard. Classes of minor economic crops did not receive the support they deserved.

Under the Fats and Oil Section, the copra class was fairly well supported, but quality did not reach a high standard. In the coconut oil class, some very good samples of oil were exhibited.

In the Poultry Section some remarkably fine birds were shown, most of them of the long-legged game cock type.

The Village Industry Section was on the whole not well supported, except the class for mats, in which there were a large number of entries. Some of the exhibits, however, reached a high standard and show us skill and promise of a latent industry.

Special exhibits were staged by the Agricultural, Co-operative and Health Departments.

The Agricultural Department's exhibits consisted of an instructional copra exhibit showing the progress the native copra manufacture has made during the past three years; a model of an ideal copra kiln suitable for kampongs; a special rat control exhibit, demonstrating the various types of traps and poisons; a section devoted to yams at which the Malays had an opportunity of sampling the roots cooked in various ways; and a general exhibit of minor economic crops suitable for the district.

connection with their egg-marketing scheme. The Health Department showed the various types of Mosquitoes causing Malaria, and also staged an interesting and useful Infant Welfare Section.

The Malayan Fertilisers Ltd., erected an attractive and valuable exhibit, which attracted considerable interest.

At various times during the day lectures on copra, poultry keeping and health problems were delivered, and during the evening the rural lecture caravan showed educational cinema films.

The attendance throughout the day was remarkably large, and great interest seemed to be taken in all the special exhibits and the general classes of the exhibition.

This is the first time an agricultural show has been held in this district, and without doubt it was an unqualified success. The District Officer and his helpers are to be congratulated on a fine effort, not only in collecting the number of exhibits but more especially on the excellence of staging and general management.

H.J.S.

CORRESPONDENCE.

Readers of *The M.A.H.A. Magazine* are invited to write to the Editor on any subjects of general interest which are within its scope.

SUPPLIERS' REGISTER.

It is hoped gradually to compile a Suppliers' Register of persons who can supply readers' requirements within the limits of *The M.A.H.A. Magazine's* sections. Suppliers are invited to register particulars of the specific breeds or plants etc., in which they are interested.

THE

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(The Official Organ of the Malayan Agri-Horticultural Association
and of the Selangor Gardening Society.)

Vol. III. APRIL, 1933. No. 2

Page.

EDITORIAL .. 42

TENTH MALAYAN EXHIBITION .. 43

AGRICULTURE.

TABLE OF SOWING AND PLANTING DATES .. 44

HORTICULTURE.

ON THE NAMES OF PLANTS. By R. E. Holttum, M.A., F.L.S. .. 46

GARDEN PLANNING IN MALAYA. By F. Flippance, F.R.H.S. .. 49

MAIDENHAIR FERNS. By R. E. Holttum, M.A., F.L.S. .. 54

HINTS ON THE USE OF FERTILISERS. No. 2. Fruits. By A. R. Westrop, N.D.A., P.A.S.I. .. 63

NEW OR INTERESTING ORNAMENTAL PLANTS. By R. E. Holttum, M.A., F.L.S. .. 66

POULTRY.

POULTRY IN MALAYA. By W. Dunman .. 69

POULTRY BREEDING. By C. Van Dort, F.R.H.S. .. 72

PIGS.

PEDIGREE AND TYPE. By Miss K. Kay-Mouat .. 75

IMPORTANCE OF WEIGHING .. 77

DIRTY UTENSILS ARE DANGEROUS .. 78

DOGS.

OUR GOOD COMPANIONS. By C. Ward-Jackson .. 79

M. A. H. A.

ANNUAL GENERAL MEETING .. 83

SELANGOR GARDENING SOCIETY.

HORTICULTURAL SHOW .. 84

DISTRICT NOTES.

KAMPONG VINEGAR .. 85

THE
M.A.H.A. MAGAZINE

APRIL, 1933.

EDITORIAL.

Readers will observe that *The M.A.H.A. Magazine* has been adopted by The Selangor Gardening Society as that body's official organ, and we are naturally extremely glad to see thus early, a response to our appeal for closer co-operation between Associations and Societies having mutual interests. The Selangor Gardening Society, since its inception in 1931, has done much to foster a growing interest in horticulture. Its activities include the holding of a number of shows each year and lectures on special subjects given by members. As will be seen from the Society's notes in this issue, it is now proposed to make arrangements for the exchange of surplus seedlings between members, a suggestion which should receive strong support from local gardening enthusiasts.

Pigs.

Miss K. Kay-Mouat, who makes a contribution to this number, has been on a short visit to Malaya, and we are fortunate in having been able to secure an article from her pen.

We recently were privileged to accompany Miss Kay-Mouat on a visit to the Government Experimental Station at Serdang and to a privately owned pig farm. Miss Kay Mouat was extremely interested in conditions out here, and we hope to include in our July number, an article recording her impressions.

Poultry.

Mr. W. Dunman, who contributes an article on poultry breeding, requires no introduction to residents of Malaya, and touches on a very important point when discussing the serious outbreak amongst Malayan poultry of a disease, apparently not yet accurately diagnosed. Mr. Dunman, in his usual vigorous manner, asks that the Department of Agriculture should give this matter careful study, and in this connection we reprint from the March number of *The Malayan Agricultural Journal* extracts from the minutes of a meeting of the Agricultural Advisory Committee, from which it appears that this subject is receiving official attention.

We understand that the question is being actively pursued by the Agricultural Department and that steps for inaugurating a policy directed towards the improvement of kampong poultry is now under consideration by by Government.

In connection with Mr. Dunman's views on poultry diseases, we gather, however, that it is considered in certain quarters that the disease problem among poultry may not be quite so simple as Mr. Dunman thinks and that a number of diseases are, in fact, responsible for the heavy mortality which from time to time occurs, although there may be one particularly virulent malady among others.

In neighbouring Asiatic countries, more is known than is the case in Malaya, concerning the poultry diseases which are prevalent and we understand that the Department of Agriculture is already engaged in collecting information on the point with a view to publication, because it may be regardend as certain that the poultry diseases which occur in Java, Ceylon and India for example, are identical in large part with those which are found in Malaya.

Special Exhibition Number.

For our July issue, we propose publishing a special and enlarged Exhibition Number which will be on sale at -/50 cents. Arrangements have already been made for a considerably increased Horticultural Section and several articles in other sections by new contributors will be included. You are strongly advised to book your copy in advance.

TENTH MALAYAN EXHIBITION.

The Tenth Malayan Exhibition will be held in Kuala Lumpur during the August Bank Holidays, the 5th, 6th and 7th August, and the Malayan Agri-Horticultural Association has already commenced preliminary organisation.

Last year's Exhibition was generally considered to be extremely successful and every effort will be made to ensure this year's Show being an even more outstanding event in Malayan history.

The competitive sections comprise Agriculture, Horticulture, Oils and Fats, Poultry, Cats, Weaving and Needlecraft, Malay Schools Handicrafts, Village Industries, Art and Photography and Pigs.

Last year the large Trade Section was particularly representative of local manufacturing industries, and it is hoped that other manufacturers will be encouraged to take part this year.

Full particulars and schedules can be had on application to the Secretary, The Malayan Agri-Horticultural Association, 12, Barrack Road, Kuala Lumpur.

Agriculture.

TABLE OF SOWING AND PLANTING DATES OF PRODUCE TO BE SHOWN AT THE ANNUAL MALAYAN EXHIBITION.

The Planting Correspondent of *The Straits Times* made the valuable suggestion that an article should be included in this number of *The M.A.H.A. Magazine* giving the latest dates by which different kinds of produce should be sown or planted in estate allotments if intended for display at the Malayan Agri-Horticultural Show to be held in Kuala Lumpur during the August Bank Holidays.

The following table has accordingly been compiled, but, it will be noted, certain produce which requires to be planted earlier than April is included, as it is hoped that the table will be filed for reference and used for subsequent Shows.

English Name	Malay Name	Method of Planting	Approximate time taken to mature	Latest time plants should be sown for showing at M.A.H.A. Show
Artichokes	—	Tubers	4 5 months.	Middle - end February
Egyptian Kidney Bean	Kachang Sepat	Seeds	3 ,,	End of April
Four Angled Bean	Kachang Botor	Seeds	2½-3 ,,	Early May
French Beans	Kachang pendek	Seeds	2 ,,	End of May
Sword Beans	Kachang parang	Seeds	3 ,,	End of April
Yam Bean	Sengkuang	Seeds	6 - 7 ,,	Early January
Beetroot	Betu	Seeds	2½-3 ,,	Early May
Benny Fruit	Cho-cho	Seeds	4 ,,	End of March
Brinjals	Terong	Seeds	3 ,,	End of April
Cabbages [Chinese]		Seeds	2 ,,	End of May
Capsicums		Seeds	3 4 ,,	Early April
Carilla		Seeds	2 ,,	End of May
Carrots		Seeds	3 ,,	End of April
Celery		Seeds	4 ,,	Early March
Chillies	Chabai	Seeds	3 - 6 mths. according to variety.	Early February - to end of April
Colocasia Tubers	Ubi Kladi	Tubers	9 months.	November
Cucumbers	Timum	Seeds	1½-2 ,,	End of May - Early June

English Name	Malay Name	Method of Planting	Approximate time taken to mature	Latest time plants should be sown for showing at M.A.H.A. Show.
Garlic	Bawang China	Bulbils	4 months.	End of March
Bottle Gourds	Labu Ayer	Seeds	3 ,,	End of April
Chinese Gourds	Labu	Seeds	2 ,,	End of May
Snake Gourds	Petola Ayer	Seeds	2 - 3 ,,	Early May
Wax Gourds	Kundor	Seeds	3 ,,	End of April
Ladies Fingers	Kachang Bendir	Seeds	2 ,,	End of May
Lettuce	Daun Salat	Seeds	6 weeks	First half June
Loofar	Loofar	Seeds	2 months.	End of May
Mamam	Mamam	Seeds	6 weeks	First half June
Mint		Suckers	2 months.	End of May
White Mustard		Seeds	2 ,,	End of May
Chinese Mustard		Seeds	2 ,,	End of May
Spring Onions	Bawang hijau	Seeds	6 weeks	First half June
Parsley		Seeds	3 months.	End of April
Parsnips		Seeds	2 ,,	End of May
Cow Pea	Kachang panjang	Seeds	2 ,,	End of May
Pigeon Pea	Kachang Kayu	Seeds	8 ,,	December
Sweet Potatoes	Ubi keledeh	Cuttings	3 - 5 ,,	End of February to end of April
Pumpkins	Labu Lemak	Seeds	3 ,,	End of April
Radish	Lubok merah	Seeds	1 month.	End of June
Shallots		Bulbils	1 ,,	End of June
,,		Seeds	4 months.	End of March
Spinach	Bayam	Seeds	4 - 5 weeks	End of June
Tomatoes	Trong Belanda	Seeds	3 months.	End of April
Watercress		Cuttings	5 weeks	End of June
Yams	Ubi Nasi	Tubers	9-10 months.	October - November.

Horticulture.

ON THE NAMES OF PLANTS,

BY

R. E. HOLTTUM, M. A., F.L.S.

Director of Gardens, S.S.

"A rose by any other name would smell as sweet." But if in conversation you refer to a rose as a turnip you will convey a wrong impression, unless your hearer also habitually uses the name turnip to indicate a rose. This is only another way of saying that if different people use different names for the same thing, they will not understand each other. Alternatively, if two people use the same name for two different things, they will equally be at cross purposes. Much confusion has arisen in the use of plant names through the ignoring of these two simple principles. Our commonly planted "flame of the forest" is known by other names in India ("flamboyante," and "gold mohur tree"), while the name "flame of the forest" is in other places applied to different trees. In Singapore, the Spathodea, a native of Africa, is often called the tulip tree; but in North America there is quite a different tulip tree. Many other examples might be quoted. Even within the Malay Peninsula, the same plants have different local names in different places. When one considers the different names the same kind of plant may have in countries where different languages are spoken, the situation is seen to be even more complex. The common useful plants of the world have different names in every country where they are grown or their products used.

The aim of botanists is to have a universal system of names, so that when anyone reads about plants from another country he will know exactly what is meant. To make sure of uniformity, a set of rules has been drawn up, but even so there are difficulties, many of them due to the fact that in earlier days no such general rules existed, and some due to mistakes by recent authors in overlooking already used names. Confusions and mistakes are continualy being corrected, and the result is often the alteration of familiar botanical names; such alterations are annoying, especially to the gardener who is more interested in his plants than in their names, and it is to be hoped that one day we shall come to the end of these changes.

The language chosen for the botanist's names is Latin. The reason for this is that the names must be current in all countries, and so they are best expressed in a universal language. Latin was until recently the universal language of scholars, and was the natural choice when the systematic naming of plants was begun. The present system dates from the work of the Swedish scientist Linnaeus in the 18th century. It is called the binomial system, as each plant has two names, the first name indicating its *genus*, the second its *species*. It is impossible to give a written definition of a species, but most people recognise one when they see one. All plants which are obviously of the same kind go by the same name, and constitute a species. Thus the common scorpion orchid is a species. It often happens that two or more species, though distinct from each other, are clearly allied; such a group of allied species constitutes a genus. The common scorpion and the white scorpion orchid both belong to the genus of scorpion orchids, which botanically is called *Arachnis*; *Arachnis* is a latinised form of a Greek word meaning a spider. The limits of a genus are naturally debatable questions, and botanists do not always agree about them. The tendency in modern times is to subdivide the older genera, and this again involves confusing changes of names.

The second or species name of a plant is often an adjective which describes it in some way, and is written with a small initial. Thus the white scorpion orchid is called *Arachnis alba* (*alba* means white). The common scorpion orchid is usually called *Arachnis moschifera*, the species name meaning musk-bearing, from the musk-scented upper sepal. Actually, an older and more correct name for the common scorpion orchid is *Arachnis flos-aeris*. "flower of the air," a name which might well be given to many epiphytic orchids. The name *moschifera* is however so well established that we may retain it for common use. Sometimes the species name of a plant is derived from the name of the man who discovered it, or it may be given in honour of some famous person who is interested in plants. The pink and white scorpion orchid is called *Arachnis Maingayi* after A. C. Maingay, who first collected it near Malacca. Generic names are also often derived from personal names. The giant water lily of the Amazon was named *Victoria regia* in honour of Queen Victoria.

Some people find the botanical names of plants difficult to remember, and they are certainly often unwieldy and difficult to pronounce. But many of them are in common use, especially the generic names of common garden plants like Bougainvillea (named after the celebrated French explorer of the 18th century), Chrysanthemum (meaning golden flower), Hibiscus, Begonia, and many others. All these names have meanings, though most botany books do not refer to them, and their history is often of great interest. But whatever may be thought of them from the points of view of euphony or appropriateness, they can never be replaced by local names, which, though often pleasing in sound and sense, have only a local application and are often not definitely recorded in print, so that their significance may be uncertain.

Local names are useful and pleasant for local use, and should be encouraged, provided that there is local agreement about them. One difficulty for both botanist and gardener in Malaya is that many plants, both cultivated and native, have no local names, so that they must go by their botanical ones till others are invented; and the invention of a local name which shall have some meaning and be also reasonably short, pleasant, and not pedantic, is no easy job. Some people have invented names of the type "purple-tipped twin-fruited jungle flower" (this actual example has never been proposed);

surely *Didymocarpus quinquevulnera* is better as a descriptive name, though admittedly not shorter in number of syllables. There are fortunately Malay names for many local plants, especially for useful ones, and though there are local differences in the use of these names, uniformity can be reached in time, especially when there is more local literature on plants. Perhaps it will be possible to invent Malay names for some of the ornamental plants which at present have none, such as the beautiful flowering herbs of our mountain forests.

Garden plants are often not natural species, but are hybrids artificially produced, or varieties which have arisen in cultivation. Such plants of cultivated origin must naturally also have names, and they are usually named by their producers. Often they are named in honour of some person who is a patron of horticulture or after a friend or relative of the producer; sometimes they are given fancy names of a more or less descriptive nature. It is now the custom, though by no means an invariable rule, for these names of garden plants to be in a non-latin form, to distinguish them from botanical names. For example, our common Vanda hybrid is called Vanda Miss Joaquim (not Vanda Joaquimiae); it was so named by Mr. Ridley in 1893, the original plant having been found by Miss Joaquim in her garden in Singapore.

Though names may be a nuisance and difficult to remember, the gardener who grows more than a few plants must know something about them. If he does not know the names of his plants, he cannot make use of any books which may have been written about them, neither can he make intelligent use of a dealer's catalogue of seeds or plants. At present the local literature which will enable an ordinary person to name his plants is very limited. Residents in Singapore and other places where there are public gardens will find many plants labelled with botanical and (where they exist) local names, and thus may learn the names of their own plants. If anyone has any difficulty, we shall always be glad to name plants if adequate specimens are sent to the Botanic Gardens, Singapore. Specimens should include a portion of stem with leaves and flowers (or fruit) attached, if possible. They are best laid flat with a few sheets of Chinese paper or newspaper above and below them, supported with a piece of cardboard. In the case of orchids, it is usually enough to send a single flower, packed in a small box with cotton wool.

GARDEN PLANNING IN MALAYA *(continued)*

BY

F. FLIPPANCE, F.R.H.S.

Assistant Curator, Botanic Gardens, Penang.

The previous article was meant to serve as an introduction. It is now intended to deal with the subject proper. Each of the different types of gardens will be dealt with separately and a commencement is made with the Small Plot, i.e. the garden of half an acre or less.

The Small Plot.

It is obvious that the small plot is liable to vary in size, from the small front or back garden to the garden of half an acre. It is necessary, therefore, to further sub-divide this section so that each of these sub-types may be dealt with according to size. Before proceeding further it would be well to point out that being small gardens they must be treated as such, particularly in the matter of planting. This is especially important in so far as choice of plants is concerned, for such gardens are obviously the wrong place to plant large trees such as Flame of the Forest, Rain tree, etc. For these gardens, trees and, where the gardens are very small, shrubs of smaller dimensions must be used if a proportionate layout is to be evolved. Therefore, it will be seen in the designs (see Figures I & II) that small trees are used and the planting generally is on a small scale, when compared with that suggested for larger gardens. With this general observation it is now proposed to deal with these small gardens.

The Small Plot is divided into two sub-types as follows:—

(i) The Front or Back Strip Garden.
(ii) The Half Acre Garden.

(i) The Front or Back Strip Garden

This type of garden is perhaps more often found in temperate climates, particularly in fairly densely populated parts, such as the suburban districts of London and other cities. It has its counterpart in Malaya, in the more modern types of terrace houses, the majority of which are provided with small garden areas, generally in the front. It seems rather a pity that the communal type of garden could not be developed for this type of dwelling i.e. that the whole space in front of a dozen houses should be laid out as one garden. Such gardens have proved a great success in America, but it is doubtful if it would be a successful scheme for this country. Therefore, it is necessary to suggest plans for these gardens, which besides improving them tremendously, would be a source of pleasure to the tenant.

The following chief points are again emphasized in making plans for these small gardens:—

(i) A sense of privacy or seclusion can be obtained by well-kept boundary hedges or creeper covered trellis and well placed small trees or shrubs.

(ii) An air of spaciousness can be provided by keeping the centre open, and by planting around the boundaries only.

(iii) Simplicity of design is imperative as the area to be laid out is very small.

Figures I & II are suggestions for dealing with the layout of this type of garden and represent two gardens in a row of houses. For the purpose of this article they are shown as having differently placed entrances. In addition to the general observations mentioned above, there are other points which have received attention in these designs. To indicate these it is advisable to take each design separately and, after enumerating the salient features, to suggest the plants to use in each case.

Figure I.

This plan is for a garden the length of which is three times its width, the latter being the width of the house. It will be seen that entry from the street and to the house is situated centrally. To ensure an open space the paths have been carried around in rectangular form. The immediate entrance from the street is under a wide archway which is the same depth as the borders of flowering shrubs flanking it. In the absence of a gate, screening of the house entrance has been effected by planting a "shrub—to block the direct view." Thus complete screening from the road is provided.

The correct view point for this garden is from the steps of the house. It will then be seen that the plan is decidedly formal in general appearance. For a garden with central entry such formal planning is unavoidable. It will be seen that such treatment has produced a more spacious appearance than would be given by a centrally situated path running from house to gate. It will be noted that planting has been confined almost entirely to the street end and immediately in front of the house.

The boundaries are represented as being well kept hedges on the two long sides, with a wall on the street side. Such a garden must of necessity be overlooked by the neighbouring houses, but at one point it is possible to provide a sitting-out place combined with a fair modicum of privacy. This is provided by planting a small tree as indicated. This tree must not be too near the house, nor must it be too far down the open space or it will interfere with the spaciousness of the design. Neither must it be allowed to grow too large, hence the choice of a small species.

The grass areas are indicated and should be easy to keep in order. A few standard Hibiscus are suggested to connect up the planting at the street end with that in front of the house.

In planting up it must be remembered that vivid colours tend to shorten a vista and soft colours tend to lengthen it. This fact may be borne in mind

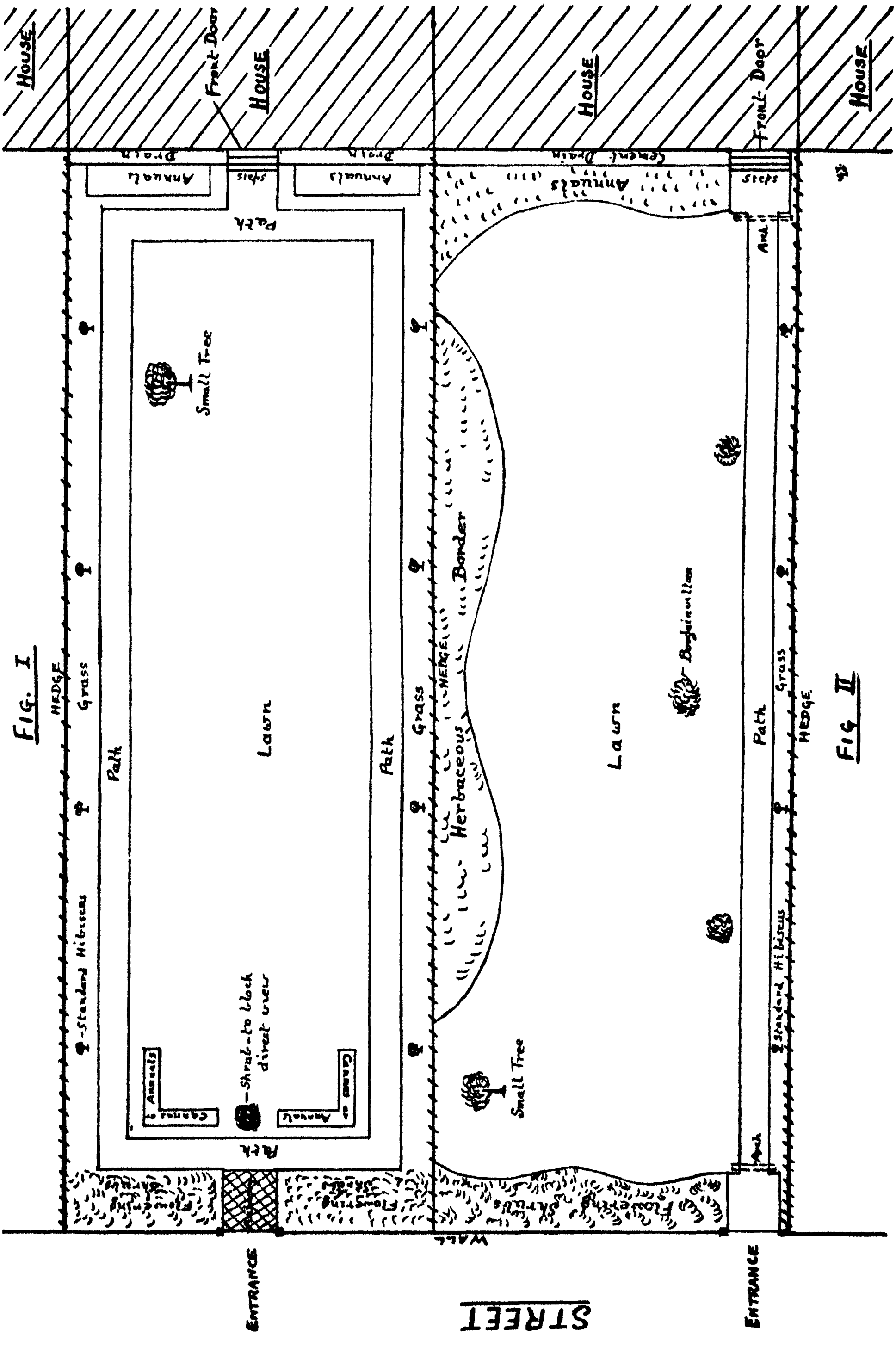


FIG. I
FIG II
HOUSE
HOUSE
HOUSE
HOUSE
Front Door
Front Door
Drain
Drain
Cement Drain
Annuals
Annuals
Annuals
Steps
Steps
Path
Path
Path
Path
Path
Lawn
Lawn
Small Tree
Small Tree
Grass
Grass
Grass
HEDGE
HEDGE
HEDGE
Standard Hibiscus
Standard Hibiscus
Shrub-to block direct view
Cannas + Annuals
Cannas + Annuals
Flowering Shrubs
Flowering Shrubs
Flowering Shrubs
Herbaceous Border
Bougainvillea
Arch
Arch
WALL
ENTRANCE
ENTRANCE
STREET

when planting at the street end is taken in hand, though little effect can be expected in such a confined area.

Planting.

The following are the plants suggested for planting up this garden.

Street-end.

(a) **For vista purposes.**

ARCHWAY—Honolulu (pink or white), Blue Bean (Clitoria), Morning Glory, Petrea volubilis.

FLOWERING SHRUB BORDERS—Duranta spp., Gardenia, Hibiscus (of soft shades), Ixoras (yellow shades), Plumeria (Frangipanni), Kopsia, and Thunbergia erecta for front of border.

BEDS ON LAWN—Cannas (yellow shades) or Annuals (yellows, blues and mauves).

BEDS NEAR HOUSE—any Annuals.

SHRUB—to block direct view—Kopsia or Randia.

(b) **For Colour purposes.**

ARCHWAY—Hololulu (red), Quisqualis (Drunken Sailor), Pink or Red Passion flower.

FLOWERING SHRUB BORDERS—Bougainvillaea (when used, only yellows, whites or blues should be used with it). Ixoras (red shades), Kopsia, Poinsettia, etc.

BEDS ON LAWN—vivid colours.

SHRUB TO BLOCK DIRECT VIEW—Ixora macrothyrsa.

House end.

ANNUALS—all sorts (placed near house to ensure safety and the greater attention which their cultivation demands).

Beside Long paths.

STANDARD HIBISCUS—double cerise, salmon pink and red.

Small tree.

MUNTINGIA CALABURA—(Cherry tree) probably the best for the purpose.

Figure II.

By comparison it will be observed that there appears to be a much larger area in Fig. II than in Fig. I. This is due to the side situation of the entrances to the garden and the house, which has given scope for a much more informal type of layout. The key notes of the design are the open centre and the irregular borders. The view point is from any part of the front of the house. The path has been carried direct from the entrance to the front door. Two archways are provided of a narrower type than in Fig. I. One just inside the garden entrance and one near the house entrance. In the absence of a gate these should provide sufficient screen for the house entrance. Planting has been concentrated on three sides and an irregular type of planting is suggested. Flowering shrubs are suggested for the border near the road, an herbaceous border for the side planting and annuals for the border near the house. As annuals form quite a big feature of an herbaceous border, the house border could be treated in a similar manner.

For seclusion purposes the hedges should be well developed and be about 6 ft. in height. A small tree is sited where it should not interfere with the general design, but rather enhance it, as well as provide a secluded spot for sitting out.

To break the straight line of the path three Bougainvillaea bushes are sited to conform with the curves of the herbaceous border. Planting of Hibiscus standards between the path and the boundary hedge is optional, for in very small areas there would not be sufficient room for them.

Grass areas are indicated and should be well kept.

Planting.

The same rule holds good in regards to choice of colours for vista or colour purposes.

Street-end.

ARCHWAYS AND SHRUB-BORDERS—as suggested for Fig. 1.

SMALL TREE—Muntingia calabura (is the best for small gardens). Rambutan and Mangosteen can be used in larger strip gardens.

HERBACEOUS BORDERS—a mixture of small flowering shrubs, Cannas and annuals.

LAWN SHRUBS—Bougainvillaea, Ixora, etc. (should be a compact type of shrub. Bougainvillaea should be clipped into shape).

In conclusion it is hoped that the figures will emphasize the merits of the formal and the informal types of layout in reference to these gardens and will give an indication of the possibilities of both. Further, it is hoped that they will illustrate that such an apparently slight difference as the siting of the entrance gate and front door, often necessitates a completely different type of garden design.

(*To be continued.*)

MAIDENHAIR FERNS, *(continued)*

BY

R. E. HOLTTUM, M.A., F.L.S.

Director of Gardens, S. S.

Distinguishing Characters.

The different kinds of maidenhairs are distinguished from one another by various characters, the description of which involves the use of a few technical terms, which will here be explained. The characters may be grouped as follows:

Branching of the frond. Most maidenhairs have much-branched fronds, but the degree of branching varies. A frond which has a central stalk (*rachis*) bearing a single row of leaflets on each side is said to be *pinnate*; a frond which has pinnate side-branches is said to be twice pinnate or *bipinnate;* a frond having bipinnate branches is *tripinnate*, and so forth. The common maidenhairs are at least tripinnate, and often four times pinnate, at the base, the upper parts of the fronds being bipinnate or pinnate. There are Malayan species of *Adiantum*, common on the limestone in the north of the Peninsula, which are simply pinnate. They are sometimes cultivated, and make useful basket plants, but most people would not regard them as maidenhairs and they are not dealt with in this paper. In addition to the degree of branching of the frond, the number of branches on each side, their length, distance apart, and the resulting general shape of the frond, are important points.

Characters of the leaflets. The length of the stalk of the leaflets may be important. In *A. tenerum* and its varieties, which form the most commonly grown group of maidenhairs, each leaflet has a joint at its base, and when it is old the leaflet breaks off at the joint. This joint can hardly be seen without a lens, but the resulting fall of leaflets from old leaves is obvious. The other maidenhairs do not have this joint. The shape of the leaflet is very important, whether more or less fan-shaped or oblong; the shape is dependent on the angle which the two edges meeting at the base make with each other, their relative length (equal or not), and the length and position of the two edges which go to make the outer limits of the leaflet. Also the way in which the outer edges are cut or divided into *lobes*. The position of the leaflet relative to the branch which bears it is important; the inner basal edge may or may not overlap the branch. Also the position of the leaflets relative to each other should be noticed, whether distant or close or overlapping. Finally, the sori are most important. The sori are borne on the outer edges (sometimes on one, sometimes on both) and occupy the tips of the lobes into which the edges are divided. In a few of the less common kinds the sori are long and occupy almost the whole length of one or both of the edges; in most they are shorter, and each leaflet bears several of them. The shape of the sori is characteristic. In some species the indusium (the reflexed flap which bears and protects the sporangia) is elongated or somewhat crescent-shaped, while in others it is almost circular.

The Principal Groups of Cultivated Maidenhairs.

(a) **The large species.** Three of these are commonly grown; all have very large fronds with leaflets more or less oblong. There are two or three others which are rarely grown and are not here described.

(b) **The group of A. tenerum.** This includes most of the commonly grown kinds. The leaflets are more or less fan-shaped, they are jointed at the base and fall separately when old, and the sori are elongated (more or less oblong; see fig. 7).

(c) **The group of A. cuneatum.** This includes some of the more dainty maidenhairs. The leaflets are more or less fan-shaped, are *not* joined at the base, and the sori are almost circular. (see fig. 13).

(d) **The group of A. capillus-veneris.** This is not important except for the species *A. Fergusonii*, which is often grown in Malaya. The leaflets are fan-shaped, not jointed at the base, and the sori are elongated, not circular.

There are other less common species which are not included above; they are much less like typical maidenhairs. One group consists of *A. caudatum* and *A. lunulatum*, limestone plants with simply pinnate leaves which are elongated and root at the tips. The other group consists of some tropical American species which are once or twice pinnate and have stiff leaflets with long single sori occupying the whole of the upper edge.

The Large Species.

Adiantum peruvianum (figs. 1 and 3). This is the largest of all maidenhair ferns grown in Malaya, and is a magnificent species. The leaf stalks may be as much as 3 feet long, and the leafy part of the frond is 2 feet long and 18 inches wide on well grown plants. It is a native of Peru, and was first introduced into cultivation in Europe by the firm of Veitch in the eighteen-sixties.

The fronds are tripinnate at the base, bipinnate towards the apex. The leaflets of large fronds are about 2 inches long and 1 inch wide; those on small fronds of young plants are usually larger, up to 3 inches long. The leaflets are borne on stalks ½ inch long; the edges meeting at the stalk form a somewhat obtuse angle, the inner edge turned back towards the rachis and meeting or slightly overlapping it, the lower edge longer and slightly oblique to the rachis. The upper edge is almost parallel to the lower, except towards the tip where it curves upwards, meeting the outer edge in an acute angle.

The upper and outer edges are shortly incised into a large number of blunt lobes, each lobe bearing a broad sorus. The indusia are at first flattened against the lower surface of the leaflets (see fig. 3); when old they curl outwards and expose the brown sporangia.

The leaves of this species droop in a graceful way and a large plant in a broad shallow pot is a fine sight. The leaflets all lie in one plane; they do not hang down at right angles to the rachises as do those of *A. trapeziforme*. Some plants however seem to be somewhat intermediate between this and *trapeziforme*, both in size of leaflets and in a partially drooping habit of the leaflets. It is possible that hybrids between the two have arisen in cultivation, but the form of the leaves, size of leaflets and general habit of these plants varies somewhat with age and the situation in which the plants are growing.

Adiantum trapeziforme (fig. 2). This is a distinctly smaller species than *A. peruvianum*. It has erect leaf stalks about 12 to 18 inches high, and the leafy part of the frond is horizontal or drooping. There are about four branches on each side of the main rachis, the lowest branches branched again, most extensively on their lower sides. The stalks of the leaflets are ¼ to ½ inch long, the largest having the longest stalks. The leaflets are almost oblong in shape, 1 to 1½ inches long, ½ to ¾ inch wide, the basal angle a little more than a right angle, the apex drawn out into an acute point. The upper and outer edges are cut obliquely into numerous short lobes, each of which bears a kidney-shaped indusium.

The characteristic feature of this fern is the way in which the leaflets hang down in almost vertical planes; they are also slightly crisped (not perfectly flat). In the figure they are shown flattened out, for convenience of illustration. The rather long acute point of the leaflets is also usually a good distinguishing feature, but not invariably so. *A. trapeziforme* is a graceful species and well worth cultivation alongside the larger and more showy *A. peruvianum*.

Adiantum polyphyllum. (fig. 4). This is a large erect species, native of Venezuela and Peru. The stalks are stout, black and shining, a foot or more tall. The leafy part of the frond is about 15 inches or more long and wide (large plants may have fronds 18 inches by 2 feet). There are three or four pairs of pinnae which are simply pinnate, lying close together, and a basal pair which each have two or three pairs of pinnate branches, the branches on the basal sides being longest. On the largest fronds the lowest branches on the basal pinnae are bipinnate. The leaflets on each branch of the frond are very shortly stalked and lie very close together, their bases (which are their widest parts) usually just overlapping. The leaflets are ¾ to 1 inch long and ¼ to ⅓ inch wide. The upper and lower edges are nearly parallel, except towards the base; the inner edges are parallel to the rachis, or sometimes slightly overlap it; the lower edges are slightly curved, almost at right angles to the rachis. The upper and outer edges are cut obliquely into short rounded lobes

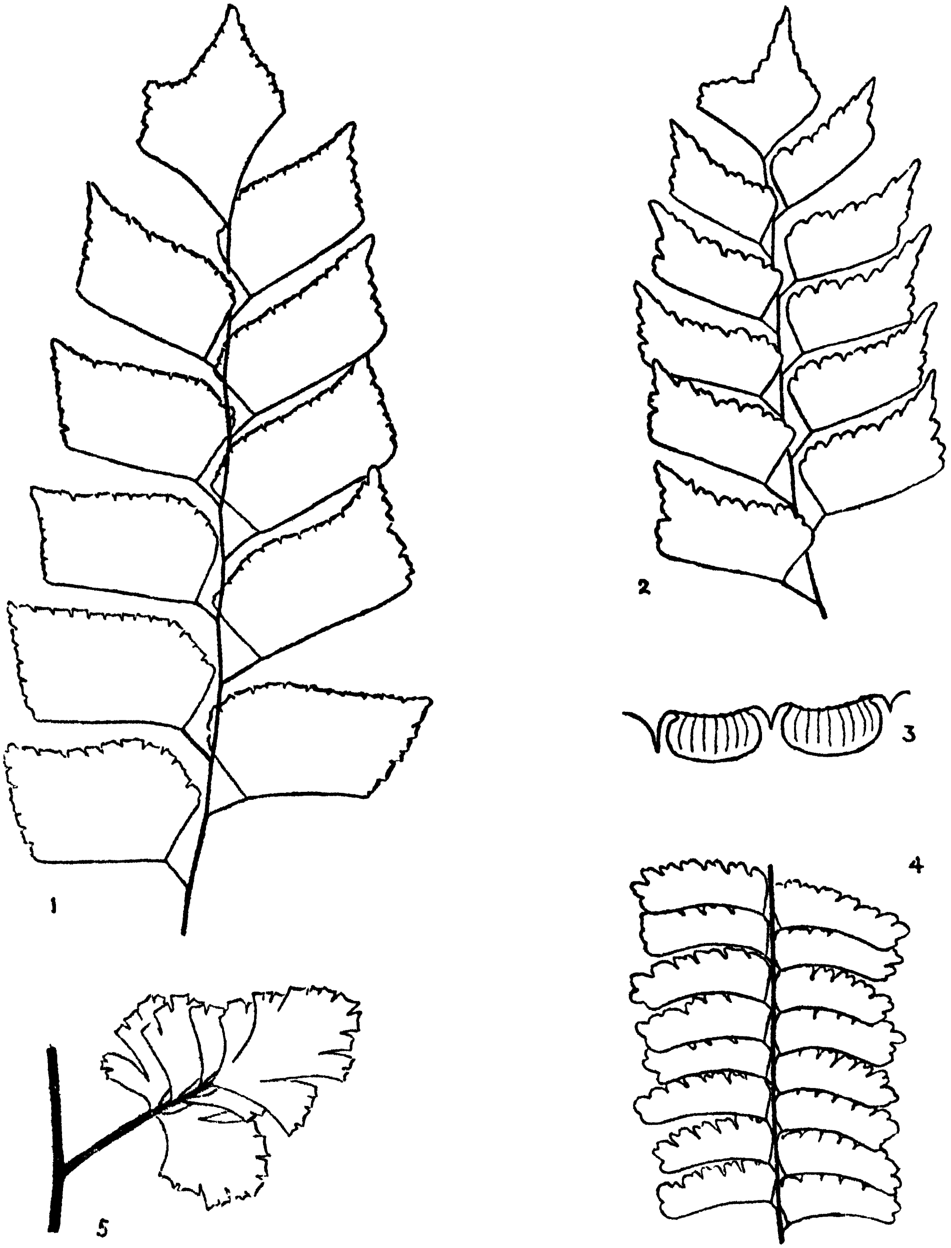


Fig. 1, *A. peruvianum;* 2, *A. trapeziforme;* 4, *A. polyphyllum;* 5, *A. Fergusoni;* small branches of fronds, about 2/3 natural size.

Fig. 3, two sori of *A. peruvianum,* enlarged.

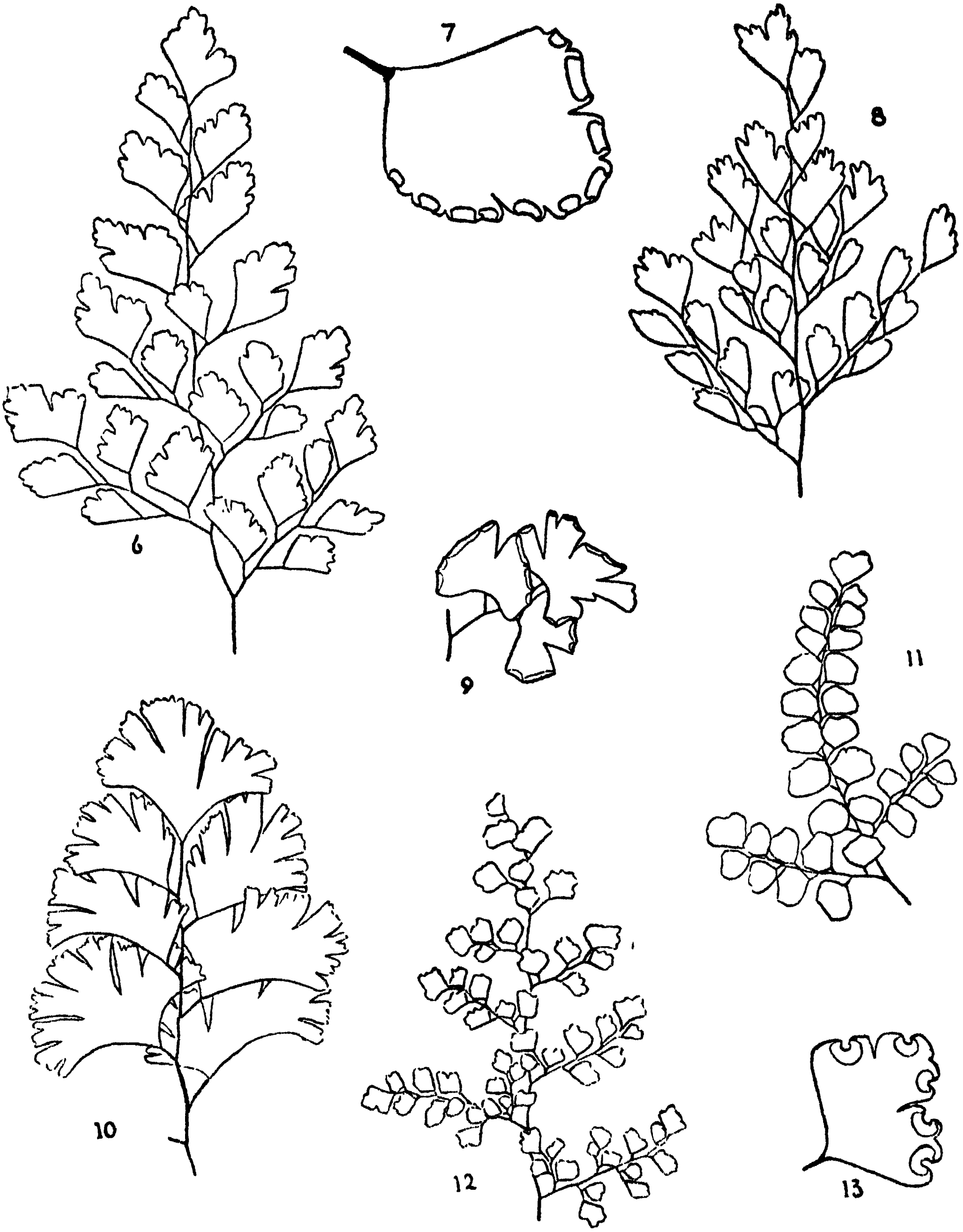


Fig. 6, *A. tenerum,* typical; 8, *A. tenerum* var. *Mrs. Napier;* 9, *A. tenerum* var. *Shamrock;* 10, *A. tenerum* var. *Farleyense;* 11, *A. stenochlamys;* 12, *A. cuneatum* var. *gracillimum;* small portions of fronds, about 2/3 natural size. Figs, 7, 13, single leaflets of *A. tenerum, A. cuneatum,* enlarged to show the sori.

which are finely toothed in the sterile leaflets and each bear a single round sorus in the fertile ones; the sori are usually only found on the upper edge, being absent on the outer one. The indusia are attached to a small shallow depression in the middle of each lobe. The leaflets are firm but thin in texture, and lie in one plane.

This is a handsome species, the branches of the tall fronds drooping gracefully. Its almost oblong leaflets are perhaps not so attractive as those of *A. trapeziforme.*

The Group of A. tenerum.

Adiantum tenerum. This species, a native of Bermuda, the West Indies and Mexico, is the most commonly cultivated of all maidenhairs in Malaya, and the one which most frequently reproduces itself from spores. There are many varieties, including *var. Farleyense*, the most prized of all maidenhairs. A few of the best known and most distinct of these varieties are described below. Two originated in cultivation in the West Indies, others in Europe, and some in Singapore. It is possible that still others, not yet recorded, have arisen in Malaya.

Typical *A. tenerum* (figs. 6 and 7) has large fronds, the leafy part to about 15 inches long and a foot broad, triangular in shape, four times pinnate at the base, with five or six branches on each side of the main rachis. The lower branches have leafless stalks about 1½ inches long. The leaflets are borne on stalks about ⅛ inch long; they are fairly uniform in size and shape, except that the ones which end the branches are often a little larger and more symmetrical than the others. Each leaflet is about ½ inch in greatest length. The two edges which meet at the stalk are unequal, the one pointing outwards being about half as long again as the one towards the rachis. The other two edges meet at the apex in a slightly acute angle; they are cut more or less deeply into small lobes, each of which bears a sorus. The indusia are kidney-shaped or oblong, attached along shallow curved depressions in the tips of the lobes. Each leaflet is definitely jointed at the base, and when the leaf is old the leaflets break off at the joints.

Var. Farleyense (fig. 10). This very beautiful fern originated in cultivation at Farley Hall, Barbados, and has been much prized by all growers since its introduction to Europe in 1866. In form of branching it is like the typical *A. tenerum* but the fronds, being more delicate and having much larger leaflets, tend to droop more than those of the typical fern. Each leaflet is fully twice the normal size, being an inch or more long; the base is narrowly wedge-shaped, the outer and upper edges combine together into a broad curve which is deeply cut several times, the divisions again cut less deeply, giving the whole a fringed or frilled appearance. The leaflets are so large that they considerably overlap each other; they do not lie flat, but are folded into waves along the edge. They are clearly jointed at the base. This is a delicate fern, and must be well protected from sun, heavy rain, and strong winds. Otherwise, the general cultural directions apply to it. It never produces spores, and must be propagated by division.

Var. Glory of Moordrecht. This very fine fern was raised in Holland, apparently as a sport from *v. Farleyense*, and first exhibited in 1911. It agrees closely with *v. Farleyense* in all characters, except that the leaves are borne on strong erect stalks a foot or more long, the leaflets are usually not quite so much frilled, and it is said occasionally to produce spores.

var. Bessoniae. This apparently originated in cultivation in Trinidad, and was first exhibited in London in 1896. It resembles *v. Farleyense* in having the leaflets closely overlapping, but differs strikingly in the very stiff nature of both stalk and leaflets. The leaflets are also smaller.

var. Victoriae. This variety originated in cultivation in Europe. It is very like a small *v. Farleyense* with fronds only about 6 inches high and never more than bipinnate. The leaflets are about equal in size to those of *v, Farleyense*, but are not so finely frilled, nor so closely overlapping. They are a bright pinkish colour when the young fronds are unfolding.

var. Collisii. This variety originated in cultivation in Europe. It is a very beautiful and graceful one. Its characteristic feature is the very broad frond, which when spread out flat is broader than long. This additional width is caused by the length of the lower branches, which are many times branched again. These lower branches have unusually long bare stalks, so that when spread out flat there is a large leafless area in the middle of the base of the frond. In the living plant this is somewhat masked by the lower branches not lying in one plane with the main rachis. The leaflets are very numerous, rather smaller than in typical *A. tenerum*, the edges usually very little cut; those on the outside of the frond tend to be larger than those towards the middle.

var. Mrs. Napier (fig. 8). This is one of Mr. Ridley's varieties. It exactly resembles *v. Collisii* in the peculiar broad shape and mode of branching of the frond, and is probably a Malayan derivative of *v. Collisii.* Its peculiar character is the shape of its leaflets, which are about twice as long as wide, with a very narrow base; the outer edges are often rather deeply cut in the larger fronds.

var. Bausei. This is very like typical *A. tenerum* but the leaflets hang down in a curiously stiff manner. At a glance, it looks as if the fern were wilting. It is a curious rather than beautiful variety, and seems to propagate itself rather freely from spores. It originated in Europe in Mr. Bause's nursery.

Var. Shamrock (fig. 9). This variety apparently arose in cultivation in Singapore. It is rather grotesque in appearance. The shape is that of typical *A. tenerum* with rather open branching, the leaflets, of about normal size, being very broad at the base, the upper parts deeply and irregularly divided, each portion bearing a sorus (sometimes divided) along the whole of its outer edge. Some of the sori are ½ inch long. The leaflets are arranged in curious little overlapping groups.

Mr. Ridley's variety "Beauty of Singapore" was perhaps only an exceptionally large plant of *A. tenerum* with very large leaflets. His

"Tanglin" has rather large almost equal-sided leaflets, the outer edges much divided. His "Bidadari" has large rather narrow leaflets. The leaf form of all these is that of typical *A. tenerum*, and their distinction is not at all clear.

The Group of A. cuneatum.

The species *Adiantum cuneatum* comes from a cooler climate than the lowlands of Malaya, and some of its varieties and allies are less vigorous in growth than *A. tenerum*, which is native of a truly tropical climate. Also it is noticeable that *A. cuneatum* does not freely reproduce itself from spores, at least in Singapore. It is possible that it would do so at our hill stations, where ferns of this group would repay special attention. Especially the species *A. concinnum* should be tried, as this is one of the most decorative of all maidenhairs. It has narrowly triangular fronds, the branches numerous and rather close, and the basal leaflet on each branch overlaps the rachis in a most attractive way.

Adiantum cuneatum. Next to *A. tenerum* this is probably the most generally grown maidenhair fern in Malaya, especially in its small variety, *gracillimum*. The fronds of *A. cuneatum* are large and much branched, at least 3-pinnate, the main branches rather distant, giving an open appearance. The leaflets are distinctly stalked, so that they are not crowded together; they are about ½ inch long, or rather more, almost equally wedge shaped at the base, the outer edge cut into a few broad divisions. Each division of the outer edge may bear a sorus at the base of a small incision; the indusium is relatively large and is almost circular (fig. 13). By the shape of the indusium this species and its varieties may at once be distinguished from *A. tenerum* the other common locally cultivated maidenhair.

Probably the most commonly cultivated form of *A. cuneatum* is *v. gracillimum* (fig. 12), which has the leaflets less than ¼ inch long and hardly lobed. This is a most graceful fern, and produces large numbers of fronds in a thick bushy growth. It grows rapidly, and is a very useful pot plant.

There are several other varieties, or allied species, but as none of them are in general cultivation, a description here is hardly needed. A few of them may be seen at the Waterfall Gardens, Penang.

The Group of A. capillus-veneris.

Adiantum capillus-veneris (Venus's hair). This species is worldwide in distribution, and has many varieties. It is rarely cultivated in Malaya, as it is very small, but sometimes an apparently native variety of it may be found on old walls. The largest fronds are usually about 6 inches long and 2½ inches wide. They are never more than bipinnate. The leaflets in the best grown plants I have seen are rather large and thin, very like those of *A. tenerum* (the most commonly cultivated species in Malaya), but more commonly they are smaller, only a little more than ¼ inch long. The leaflets are not jointed at the base, and so do not fall off singly when they are old. This absence of a joint distinguishes *A. capillus veneris* from small plants of

A. tenerum; if the two are examined with a hand lens the difference is clearly seen. The sori are oblong, much as in *A tenerum.*

This is a pretty little plant, worth growing on walls in fern houses and similar places, but hardly worth growing in pots except as a matter of interest.

Adiantum Fergusoni (fig. 5). This fern is named after a Mr. Ferguson who sent it to England from Ceylon in the early eighteen-eighties. He obtained it from a friend who had bought it at a sale in Colombo, and its previous history and origin are unknown. It has never been found wild, and probably originated in cultivation from *A. capillus-veneris.*

The fronds will grow up to 2 feet in height, though they are commonly smaller. They are rather stiffly erect and bear rather short and distant branches. The branches are leafless in their lower parts, and each has a crowded group of overlapping leaflets towards its tip. Each ultimate branch of the frond usually consists of a large terminal leaflet, about an inch long and ¾ inch wide, its base narrowly wedge-shaped, its outer edges with several deep divisions, the divisions each bearing one or more sori; below this large leaflet, on either side, are small narrowly wedge-shaped lateral leaflets, all attached very close to the base of the large leaflet and overlapping with it.

This species resembles *Adiantum tenerum var Farleyense* in the overlapping leaflets, but it is very different in the following points: the fronds are stiffly erect, not drooping; the branches are rather distant and have leafless lower parts; the leaflets are rather stiff in texture and do not all lie in one plane as do the delicate leaflets of *v. Farleyense. A. Fergusoni* is an interesting species, and well grown plants are quite handsome, though they cannot compare for gracefulness with those of many other maidenhairs.

Adiantum stenochlamys. (fig. 11). This little plant grows on rocks by the sea, especially on the east coast of the Peninsula. It is distinctly stiff in habit, and not so graceful as the commonly cultivated maidenhairs, but quite a pretty fern, and interesting on account of its local occurence.

When well grown, the fronds have stalks 8 inches long and the leafy part is 8 inches long and broad. The branching is very open, the few pinnae being alternate and the main rachis distinctly zig-zag, turning first to one side and then to the other. The fronds are bipinnate at the apex, tripinnate at the base. The leaflets are about ⅓ to ½ inch wide and are borne on stalks ⅛ inch long. They are obtusely angled at the base (in young plants the base is sometimes straight, without any angle) and the outer edges form a continuous broad curve, thus giving the leaflet an almost perfect fan shape; the the two basal edges are however usually a little unequal. The curved outer edge is minutely toothed in sterile leaflets and bears a row of crescent-shaped sori in fertile ones. The largest leaflets are sometimes deeply divided into two parts, but usually there are no deep divisions. The leaflets are decidedly stiff and tough in texture, much more so than those of the commonly cultivated American species.

HINTS ON THE USE OF FERTILISERS,

BY

A. R. WESTROP, N.D.A., P.A.S.I.

No. 2. Fruits.

Many of the indigenous fruits are so naturally hardy that it is often not appreciated how greatly fruits benefit from judicious manuring. By the use of suitable fertilisers however at the time of planting and by subsequent small but regular applications not only does a more vigorous plant result but a substantial advance can be made in the time of fruiting whilst the fruits themselves are larger, of better shape and, it is sometimes claimed, sweeter in flavour. Judicious manuring also assists trees to throw off insect or fungus attacks.

Phosphoric acid is the dominant plant food concerned in the production of fruits but a proportion of nitrogen is essential for vigorous vegetative growth and potash assists in the formation of healthy wood and possibly influences the percentage of sugar resulting in sweeter fruits. For these reasons suitably balanced "complete" fertilisers usually give the best results. By including quickly acting chemical plant foods such as nitrate of soda, sulphate of ammonia and superphosphate in combination with the slower acting organic fertilisers such as Bone Meal, Sterameal, Oil Cakes and local guanoes, a rapid, continuous and lasting effect can be obtained and "complete" fertilisers manufactured on these lines can now be obtained locally.

Recommendations.

Soft Fruits.

(1) *Pineapples.* This is a crop which if grown continuously on one area benefits from very heavy manuring. In Hawaii, Florida and the West Indies as much as 1500 lbs. per acre per annum are employed.

The root system of the pineapple is shallow and limited in its lateral extension. Manures must, to be beneficial, be applied on or immediately round the plant. In field practice it is usual in the single row system of planting to apply manure to each individual row of plants, while in the two or three-row system, the manure is scattered broadcast over the plants. The manure lodges in the axils of the leaves and is gradually washed down from the leaf bases to the soil immediately surrounding the stem.

It is therefore essential to avoid injury to the foliage and after the first application which should be made round the base of the plant immediately after the plants have become established, it is advisable to limit chemical sources of plant food to less than half of the total bulk of the mixture. The annual application is usually divided into two or three dressings. A typical mixture for use in this manner is as follows:—

Ground Nut Cake	25	parts
Steamed Bone Meal	20	,,
Sulphate of Ammonia	17	,,
Concentrated Superphosphate	10	,,
Phosphate Guano	12	,,
Sulphate of Potash	16	,,
	100	,,

analysing 6% nitrogen, 10% phos. acid and 8% potash. A full annual dressing for pineapples in gardens would be 4 oz. per plant.

On peat soils a basic mixture has given excellent results.

(2) *Papayas.* These benefit from a similar mixture to that suggested above applied at the rate of ½ to 2 lbs. per tree preferably divided into two or three applications.

(3) *Bananas.* This is another crop which is regularly cultivated on plantation scale as in the West Indies, which repays heavy manuring but in Malaya has so far received little attention.

The mixtures employed usually contain rather a higher percentage of nitrogen and potash in comparison with phos. acid than are employed in the case of pineapples and the fertilisers used in the West Indies almost invariably include about 3% of sulphate of iron. From 1 to 2 lbs. per stool at four to six monthly intervals are employed.

(4) *Strawberries* The cultivation of this crop is likely to become of increasing importance in the Highlands of Malaya. In England a chemical mixture analysing 5% nitrogen, 6% phos. acid and 4% potash used in conjunction with farmyard manure is popular but on the friable soils of the Cameron Highlands a mixture including organic matter should be employed.

Stone Fruits.

Under this heading may be included Mangoes, Rambutans, Mangosteens, Guava, Custard Apple and the citrus fruits such as Limes, Oranges, Grape-Fruits and the Pomelo. Phos. acid is of the greatest importance in the manuring of these trees and too much nitrogen increases the foliage at the expense of production of fruit. In view of the permanent nature of the crop, manures, such as Bone Meal, which have a cumulative effect are particularly valuable.

A mixture which has given excellent results in Malaya is as follows:—

Sulphate of Ammonia	15	parts
Castor Meal	20	,,
Sterameal	10	,,
Concentrated Superphosphate	15	,,
Steamed Bone Meal	25	,,
Muriate of Potash	15	,,
	100	,,

analysing 5% nitrogen, 12% phos. acid and 8% potash.

A suitable rate of application is from ½ to 1 lb. per year of age with a maximum according to the size of the tree and nature of the soil of 5 to 7 lbs. per annum, i.e., on a good soil a four year old orange tree would require 2 lbs. of fertiliser.

The best method of application is by means of "envelope" forking which permits of the fertiliser being distributed at a large number of points and at a maximum depth without undue disturbance or cutting of the roots.

Young Fruit Trees.

All young trees greatly benefit from the use of a fertiliser at the bottom of the planting hole. Owing to the different rates of decay of the blood, meat, sinews, hoofs, horns and bones of the carcases from which it is manufactured, the complete organic fertiliser Sterameal is extremely steady, continuous and lasting in action and gives excellent results with all young plants. Up to ½ lb. per tree according to the size of the seedlings and nature of the fruit should be employed per planting hole. Where it is desired to push on young trees already planted a soluble concentrated fertiliser such as Supram, Enpekay or Nitrophoska may be employed in doses of from 2 to 4 oz. per plant.

NEW OR INTERESTING ORNAMENTAL PLANTS,

BY

R. E. HOLTTUM, M.A., F.L.S.

Director of Gardens S.S.

Afgekia sericea

This is a woody climber, native of Siam. It was first collected by Dr. A. F. G. Kerr of Bangkok and Prof. Craib, considering it to rank as a new genus, coined the name *Afgekia* from the initials of its discoverer. The species name *sericea*, meaning silken, refers to the long pale silky hairs with which the leaves are covered. Dr. Kerr kindly sent seeds to the Singapore Botanic Gardens in 1929, and the first plant was trained to climb on the front of the plant house. It flowered in December 1930, and later began to flower quite freely and almost continuously. The first seeds were produced in 1932. It is a very decorative species, and owing to its free-flowering habit it is a very welcome addition to Malayan gardens and deserves to be widely known.

The Singapore plant still has quite a slender main stem, though its leaves and flowers are mostly on the roof of the house, 12 feet or more above ground. The leaves are pinnate, with about 8 pairs of leaflets; the leaflets are covered beneath with long pale silky hairs which make them soft to the touch, and the same hairs form a distinct pale edge, and a short pale tip to each leaflet (a few may also be seen on the upper surface). The flowers are borne in conical heads. These curve upwards, the tip being clothed with long narrow overlapping pink bracts (also covered with silky hairs) which protect the young flower buds. These bracts add much to the colour and decorative value of the plant. There are usually several flowers open at once. They are of the typical pea or bean type, cream and pink in colour, the keel being cream, the lateral petals pink, and the standard (upper petal) creamy yellow with a purplish base. They are more or less silky-hairy all over. Each inflorescence continues to produce new flowers for several weeks, the old ones falling off; the base of the stalk which bore the first flowers hangs down among the leaves and is not noticed, while the flowering end of the inflorescence curves gracefully upwards. Finally, old flower stalks reach about two feet in length. Each inflorescence seems to produce one to three fruits in Singapore. The fruits are short fat woody pods, each containing two or three seeds.

The plant seems to be easy to cultivate, and would climb over any kind of frame or pergola. A single plant will evidently live for several years, and we have no information how large it will grow. It is evidently not among the very heavy woody climbers.

So far no trial has been made to propagate *Afgekia* from cuttings,

Afgekia sericea

and if it produces seeds fairly freely, it is probable that seeds will be the best means of propagation.

Pentas coccinea

Pentas carnea, with its pale pink flowers, has long been known in Malayan gardens, and there is also a white variety of it. The bright red *Pentas coccinea* is however a fairly recent introduction, and one that should be popular.

Pentas coccinea is a small shrub, the plants not usually exceeding two feet in height. They have spreading lower branches. The leaves are in opposite pairs, simple, soft in texture, the edges curved upwards and rather wavy, pale beneath with soft hairs. Side shoots soon grow from the leaf axils, forming groups of leaves at each node of the stem. The flowers are in heads very similar to those of *Ixora* (which belongs to the same family); the flower heads are at the ends of the branches. Each flower is star-shaped with 5 narrow petals, bright crimson in colour. The petals radiate from the top of a slender tube, the throat of which is full of short hairs (easily seen with a hand lens). Below the hairs, inside the tube, are the stamens, while the red stigmas are borne on a slender style which projects some distance beyond the petals and is easily seen. The groups of flowers are very compact and even in shape, and with their bright colour are very decorative.

The plants are easily propagated from small cuttings of the young green side shoots, planted first in sand, and grow quite quickly. They make useful pot plants for a verandah or the front of a house, being less light-demanding than some flowering shrubs, and they may also be bedded out.

The genus *Pentas* is widely distributed in Tropical Africa, and especially East Africa. Dr. Stapf, in describing *P. coccinea*, says "this plant is a common element of the dry littoral of the East African coast from the Tana to the Pangani rivers, and during the dry season it is an ornament of the grass-land owing to its brilliant crimson flowers." Seeds of it were sent to Kew from Amani, and from Kew a plant was brought to Singapore in 1926. Dr. Stapf states that "at Kew the plant has so far been treated as a stove plant and kept rather moist," and suggests that considering its native habitat a drier treatment might be more suitable. In Singapore we have found that the plants will grow and flower quite well under rather moist and shady conditions, but they undoubtedly grow more vigorously in more open places. Our best plants are in a bed having full sun till about 2 p.m. The plants flower almost continuously, which is fortunate, as if they only flowered during the dry season they would not be much use in Singapore.

There is another interesting point about the species: there are two kinds of flowers, the one kind with stigmas protruding and the other with protruding stamens and short stigmas. The former flowers are much larger than the latter, and therefore more decorative. Each single plant bears flowers of one kind only. In Singapore our plants are all of the larger flowered type and if we continue to propagate them from cuttings they will remain so. No seeds have yet been produced, and it is possible that cross pollination from one kind of flower to the other is necessary for fertility, in which case we should have to import the other type of plant before we could produce seeds. The other type of plant, with smaller flowers, is less decorative and therefore less desirable, and there is no need to introduce it for propagation purposes, as *Pentas coccinea*, is easily propagated from cuttings.

Lantana sellowiana

This pretty little plant appears not to be generally known in Malayan gardens, though it is occasionally seen. It has evidently been known in the East for some time, as it is mentioned in Firminger's "Gardening in India," but there is no definite record of its introduction into Malaya. The oldest record we know of at present is a preserved specimen from Penang dated 1918. Subsequently the species seems to have been lost from the Penang Gardens, and has lately been recovered through the kindness of Messrs. J. M. Jackson and J. A. le Doux of Singapore. Its native home is South America, and it was first introduced to Europe by seeds sent from Montevideo to Berlin in 1822 by a German botanist named Sellow.

The plant is creeping, not shrubby like the common Lantana, and has very slender stems. The leaves resemble those of the common Lantana in shape, but are much smaller. The flowers are in small compact heads, of a pretty bright pinkish mauve with yellow centres, very much like Verbena flowers (Lantana belongs to the Verbena family). They finally produce groups of dark-coloured fleshy fruits. The habit and flowers of the plant are very Verbena-like, but the simple undivided leaves and fleshy fruits distinguish it.

This is most useful where a creeping free-flowering plant is required in a sunny place, such as a low terrace wall or sun rockery. It may also be trained to grow over a wooden frame, and could probably be grown in hanging baskets. It flowers freely and almost continuously. It is easily propagated from half-woody cuttings.

(To be continued)

Poultry.

POULTRY IN MALAYA,

BY

W. DUNMAN.

Malaya is essentially an agricultural country and that being the case does it not seem strange to find it impossible to get a decent egg for one's food, and we are told that a couple of million dollars a year leave the country for the purchase of eggs and fowls. Obviously everything possible should be done to remedy this. We want good eggs and fowls for consumption and we also want to keep all the dollars possible in the country, particularly at the present time.

Now what is the reason for this state of things. During the past eight or ten years a disease has been prevalent in many parts of the world devastating the poultry and it is to be found all over Malaya and at certain seasons wiping out all the fowls in the kampongs.

Poultry experts and vets have so far done very little to help in combating this disease and cannot even give it a name. Investigation by, and experience of many who are interested in poultry locally make it clear that the disease can be avoided by correct feeding and proper sanitary measures and housing.

It seems that at some periods the fowls cannot get insect food and as a certain amount of animal food is essential to provide a certain vitamin, the want of this causes the disease, precisely as with beri-beri in eating polished rice thereby eliminating the necessary vitamin, as proved years ago by Dr. W. L. Braddon and confirmed by the Lister Institute. I notice this is corroborated by Mrs. Fawkes in her book on poultry farming in the East.

My own theory is that if poultry are fed with a properly balanced diet they will be practically immune from the disease and I have suggested to Dr. Tempany to try the experiment by placing a properly fed healthy fowl amongst infected fowls and see the result. This would cost nothing but would be of immense value. Why not try it at Kuala Kangsar?

The Co-operative Societies Department is doing good work regarding egg production and marketing but the kampong people require teaching, particularly regarding correct feeding, but above all some arrangement should be made for the distribution of fishmeal which is so essential. It is easily procurable and costs very little. This is all important.

Suggestions have been made that in these depressing times the unfortunate planter should have some hobby. Why not go in for rearing through-bred poultry. The kampong fowls are mostly hopelessly useless as proved by the diminitive size of the eggs, and it is necessary to provide well bred cockerels, which would result in useful cross-bred fowls. Consequently there will be a demand for some years to come, apart from which people will willingly pay for a decent sized fresh egg.

Again the custom is to buy fowls for table purposes which have been running about with no attempt to prepare them for the market whereas a fowl should be kept in a coop for three weeks, and then it is worth eating.

Unquestionably considerable interest is now being taken in poultry and those owning pedigree fowls have difficulty in supplying the demand for eggs for sitting purposes.

An important poultry farm is in operation in Singapore under the management of Mr. Letondu who is an expert. They have I understand some 4,000 head of poultry and have booked orders for eggs up to June.

Poultry food is now imported from Australia to Singapore and there are also distributors.

All this shews that considerable interest is being taken in poultry rearing, and it should be encouraged in every way possible.

Some arrangements should be made for stocking poultry food either in Kuala Lumpur or Port Swettenham, importing it direct from Sydney.

The following are required:—wheat, wheat bran, oats, pollard, ground maize, haying mash and chicken food. In addition the following are procurable locally:—fishmeal, bonemeal, maize, oyster shell grit, charcoal, padi and bran. Most people prefer to mix their own poultry food and grit mills should be stocked.

In investigating the matter of the poultry disease I have questioned a number of people, both planters and others who have kept poultry and it is astonishing to find how very little they know regarding the rearing of poultry. It would be advisable for them all to get a useful book and make a study of the subject. For those wishing to make a business with poultry, incubators and brooders are necessary and there is a lot to learn about it all: this is quite apparent seeing that a book on the subject I have before me contains some 200 pages.

Some time ago the Field Officers of the Agricultural Department were reported to have done excellent work in regard to the opening up of vegetable gardens near the towns and also in teaching the natives correct methods of manuring etc. This was particularly the case in Negri Sembilan under the management of Mr. W. H. Barnes who had some fine Light Sussex fowls. It seems obvious that these Field Officers could also help in teaching the kampong people something about the correct methods of rearing poultry and also arrange for the distribution of fishmeal which is so all important and which will go far in preventing the disease. This will require some organization but surely the Agricultural Department must realize that poultry is even more important than vegetable gardens. It is not a new branch of work for them seeing that they already have poultry farms at Fraser's Hill and Kuala Kangsar and intend starting one at Tanah Rata.

In my opinion there is an excellent opening for poultry farming in the Southern Highlands. In considering a new line of business one looks for something for which there is a demand. Apart from high-bred fowls urgently required for improving the stock all over the country there are table birds and eggs wanted by the tens of millions.

No doubt much can be learnt from the National Poultry Station at Weybridge, Surrey, but in the meantime we know that the up to date planter who goes in for poultry does not lose his fowls from disease, simply because he knows how to feed them properly. This was my own experience for two years with fowls dying in hundreds close by. The necessity of animal food or fishmeal in poultry food is not an experiment. Just see what Mrs. A. K. Fawkes says about in it her well known book on poultry farming and after all is it not simple common sense?

I only hope the Agricultural Department agrees with my views and will take steps to assist an industry which sorely needs help.

AGRICULTURAL ADVISORY COMMITTEE.

The following extract from the minutes of a meeting of the Agricultural Advisory Committee held on the 16th February, is reprinted from the March number of *The Malayan Agricultural Journal.*

Poultry. The Committee was informed that the Department of Agriculture has held intensive discussions with the Co-operative Department and with Government on the question of the encouragement of poultry raising, from which it has emerged that three useful avenues for work exist.

(1) The organisation of distribution of poultry and eggs. Schemes for the sale of eggs already exist, sponsored by the Co-operative Department.
(2) Provision of instruction for the small producer on better methods of handling poultry and
(3) Treatment and prevention of disease.

POULTRY BREEDING,

BY

C. VAN DORT, F.R.H.S.

It is surprising that so many poultry breeders, men and women of wide practical experience, are so ignorant of the laws governing the reproduction of species. I do not profess to be anything of an authority on this subject, in fact have but a nodding acquaintance with it and that more with regard to plant breeding than poultry breeding. However the little knowledge I have gleaned has proved of such great value to me that I pass it on for the benefit of others, who like myself have not had the advantages of a scientific training.

I believe the first step in poultry breeding is to have a clear and concise idea of what you want to achieve. Are you breeding for egg production, the table, the show pen or a general purpose bird? If a general purpose bird, the size, weight and number of eggs you expect to obtain, colour and general appearance should be as clearly defined in your head as if memorised from a book giving the standards of some new breed. It is one of nature's laws that the use of any organ or part of the body tends to its increase; the disuse, to its decrease. By adopting a method known as "lining" which is based on the above law, one can roughly gauge whether the birds selected are suitable for the purpose for which you intend them. An imaginary line is drawn through the centre of the body from a spot just behind the shoulders to the legs. If the greater portion of the body is behind this line, it denotes the bird is a good layer, for it is here the egg organs are situated, while the table qualities are comparatively poor. If the greater portion of the body is in front of this line the bird is more valuable for the table, while if the fowl is equally balanced fore and aft you have a general purpose bird. Even with native or mongrel fowls the above method will be found useful.

The next thing to be remembered is that shape, size, feathers and general appearance are derived from the male. It must not be thought that the male has no influence upon the economic qualities such as temperament and fecundity. It undoubtedly has, though in a smaller degree than the hen. The hen possesses the greatest influence upon the inward characteristics, such as the vital organs, internal structure, fecundity, and temperament. It must not be forgotten that another of nature's laws is that "like produces like." Thus if the parents possess any glaring faults, in nine case out of ten they will be reproduced in the offspring in an intensified form. It is therefore essential that only perfectly healthy birds be used for breeding. Birds which have at any time suffered from any organic disease, even though they may have recovered and appear to be in good condition, should never be used for breeding.

The wise poultry keeper should always keep his very best birds for breeding from and never sell them, however tempting the offer, or he will never be able to establish a good strain.

It is difficult to define what is meant by strain, but for example two breeders, in starting, obtain each, a pen of birds of the same breed and from the same source; one breeds his birds for the show pen and the other for egg production. At the end of ten or twelve years they would still both possess the same breed but the birds would be vastly different in appearance and capabilities. That is why novices often are very disappointed when buying their stock and often unfairly blame the dealer. They buy a bird of a recognised egg producing breed stating that they want to exhibit the bird. Later they hear of a pen of the same breed which is producing double the number of eggs their birds do or they buy good layers and blame the judge if it does not win a prize. Strain is obtained by ruthlessly getting rid of every bird that does not approach close to the standards you have laid down. That is breeding by selection. It is amazing what results can be obtained by selection alone but however carefully the selection is made a certain amount of variability will be experienced. These variations are of a minor character which can, if required, be increased and perpetuated. To fix any such variation requires generations of breeding under the same conditions. The longer the period that the birds are bred under the same conditions, the less the tendency to variation. In trying to fix some such variation as colour, it is often necessary to "inbreed." "Inbreeding" is to use related stock in the breeding pens. In the hands of a skilled breeder who knows just how far he can go, inbreeding is an effective method of obtaining a desired result. To any one who has not taken the trouble to study the subject it would be disasterous.

Indiscriminate inbreeding produces chickens that are delicate and difficult to rear or the eggs laid are infertile. I have an idea that much of the sickness that poultry keepers complain of is due more to inbreeding than to neglect or insanitary conditions. The chickens being predisposed to every conceivable disease grow slowly and if they do survive, are considerably smaller in size than they would have been if the parents were unrelated.

While it is an excellent plan to keep your stock pure, if carried to an extreme it becomes a decided danger. With all pure races there is a tendency to get exhausted and a sort of general enfeeblement sets in. To overcome this "out breeding" has to be adopted. One must search for a strain unrelated to one's own but which possesses the features that one is seeking to improve in one's own birds. An example of this is to be seen in the Black Minorca which has had a touch of Black Hamburg blood introduced in order to maintain its vigour. This must not be confused with "cross breeding" which is quite distinct. In cross breeding two birds of different pure breeds are mated together in order to combine if possible the good qualities of both. It is well known that first crosses are hardy, quick growing and combine the good qualities of both parents to a great extent but if these first crosses are themselves bred from, they commence to degenerate. Out here the chickens obtained from the crossing of a pure breed with a native fowl is called a crossbred. The native fowl is the result of years of indiscriminate matings and is akin to the jungle fowl.

COD-LIVER OIL FOR HENS.

Two flocks of Rhode Island Red pullets in a test at Ohio State University were fed the same ration and handled in the same manner, except that one lot received cod-liver oil with the ration while the other did not.

The birds without the oil laid 6,061 eggs, while those with the oil laid 7,142 eggs.

It took 7.45 lb. of feed per dozen eggs where there was no oil, and 7.37 lb. where oil was supplied. The loss in weight of the flock getting the oil was 210 lb., and in the other lot 275.5lb.

Mr. H. F. Hutcheson of the Kinta Valley Estate, Batu Gajah wishes to get into touch with anyone who has settings of Rhode Island Red Eggs for sale.

Pigs.

PEDIGREE AND TYPE,

BY

MISS K. KAY-MOUAT.

Miss Kay-Mouat has been interested in Pig Breeding since 1904 and writes therefore, with considerable knowledge of her subject. In addition to being a member of the Councils of both the Large Black Pig Society and the National Long White Lop-eared Pig Society, Miss Kay-Mouat was Chairman of the Scientific Research Committee of the Large Black Pig Society, and has, herself, won numerous prizes at the classic shows in Great Britain.

Nature in every department is governed by a code of laws as yet only vaguely apprehended by man, and it is on such laws the universe runs. When man interferes by altering conditions he must substitute other laws based on scientific theories to govern his movements or havoc and waste will result. Here we are only considering one small unit in the sphere of animal husbandry, the domestic pig as a source of human food, when the outlook for the pig has veered round from the wild to the domestic state, demanding a complete readjustment of conditions in its mode of life.

The subject of genetics has advanced by leaps and bounds during the last 30 years, breeding no longer is the haphazard lottery it used to be but today is a direct return based on the knowledge and foresight governing the industry. In animal husbandry nature mates up on a broad basis for the survival of the fittest but man mates the domestic pig for his own ends, to produce a type; the more definite that type the greater the success in breeding. It is no good vaguely saying "Oh, yes; we want a good carcass of meat." The breeder of live stock has to consider many more details than nature was concerned with; conditions of rearing, the quality of the flesh, the proportion of flesh to offal, type and so on—in other words, the breeder's *desideratum* is a carcass moulded to type and produced on economic lines. This may not sound much but it entails a vast amount of knowledge on questions affecting breeding and management, also the laws of heredity and the science of nutrition, in so far as they affect animal husbandry.

All breeding has its origin in the union of the chromosomes; the offspring inherits the characters of the parents which may be either dominant or recessive, therefore the greater the diversity between the parents the more heterogeneous the offspring. If breeding is moving towards a definite end, such as one type of carcass, records must be kept, breeds must be maintained pure, genealogical charts or pedigrees must be instituted. These "pedigrees" are of little worth unless they are accurate and reliable, therefore it is advisable that they should go through a clearing house as it were, some association or society run for that purpose, where their accuracy is vouched for and where these documents can be preserved in an easily accessible form for the benefit of all concerned.

The term *pedigree-breeding* refers to a limited range of matings restricted within a definite group or breed, where each is built up on the records of their ancestral lines. Within this grouping are three main sub-divisions:—

In-breeding, a system which refers to mating within the breed of consanguineous animals, or in other words, mating within the family circle.

Out-breeding, when the parents are of the same breed but quite different strains, there being no relationship whatsoever.

Line-breeding, when the animals are of the same breed and strain, having a common ancestor on both sides of the genealogical tree, but where no close relationship exists. An excellent example of this system of breeding is the Jewish race, where consistent breeding has fixed certain characteristics until they have become prepotent. It is this method of line-breeding which is the surest means of fixing desirable points for the intelligent breeder of all live stock.

On the out-skirts of pedigree-breeding is a system of mating known as *Cross-breeding,* when a pedigree or pure-bred animal of one breed is mated to a similar animal of another breed within the same species, the resulting offspring being technically known as a "First Cross." Any mating outside the genealogical tree and beyong a first cross produces a "mongrel."

It is only by consistent breeding that characters common to both parents can be fixed: Galton formulated the following law of Ancestral Inheritance in this connection:—"The two parents contribute between them, on the average half of the total heritage; the four grand parents a quarter; the eight great-grand parents one eighth; and so on." The more consistent the breeding, the more potent the strain; a pure-bred animal shows prepotency over a cross-bred animal and a like-bred animal an out-cross. It is often stated that the boar is more than half the herd, a dangerous and incorrect statement as it stands, for it is *prepotency* that counts. It is infinitely better to maintain the female side of a herd at a high uniform level than to put any false value on an outstanding sire; an indifferent and miscellaneous bunch of females with a pedigree boar to sire the herd, whose breeding is one series of out-crosses leads nowhere and is suicidal policy in pedigree-breeding. What is of importance is the breeding of the boar especially on the dam's side; there should be no undesirable characteristics for at least three generations back or they might prove dominant and ruin a herd. On the other hand desirable points should be "fixed" in the sire when they are lacking on the female side.

In building up a pedigree herd the fundamental starting point is a fine even group of females—whether five or fifty matters not—they should be of one strain and the initial mating should be a judiciously selected "out-cross," the first and last for many years. The subsequent matings should be according to line-breeding, selecting the mate for every female on her merits, but

"McHeather Beauty" as a gilt in farrow and with her first litter.
This sow was taken by the Large Black Pig Society to illustrate
"A typical sow" for their Herd Book.
Owned and bred by Miss Kay-Mouat.

always working towards the fixed type. Essential points should be bred for first, working on and fixing one point at a time, then passing on to the next; for example, loin first, then the ham and so on, throughout the carcass points. The pedigree-breeder has also the breed characteristics to consider, small but essential iotas, for appearances go a long way in man and beast alike; they are easily bred in or bred out of a herd.

One word as regards constitution; this is a factor of pre-eminent importance and a factor in which the dam is prepotent. No sickly animal should ever be bred from however good its points or disaster will surely follow. Breed for prolificacy, for a good udder, and for constitution; if a feature has no commercial value eliminate it if possible or reduce it to a minimum. There are some breeds nearly all fore-end, some with mighty jowls, others with legs like a grey-hound, scrap these and go to the breeds which are made up of essentials and where consistent breeding has for many generations reduced the cheap meat on a carcass to a negligable quantity.

IMPORTANCE OF WEIGHING.

The only sure and certain way of ascertaining the rate of progress which is being made by a certain batch of pigs is by means of the weighing machine. This may entail a little trouble, though, if a platform machine be used, it is quite easy to rig it up in such a manner that each pig can be put to the platform in turn, so that each weighing occupies no more than a few seconds.

The best plan is to have a couple of pens with a connecting passageway, the machine being placed in the latter and so fenced that each pig, as it is herded out of the first pen, is obliged to stand on the platform.

Its weight having been ascertained, it is then let out into the second pen, and the process is repeated with the remainder. The automatic type of machine which registers the weight without any manipulation is, of course, the best to use, and will soon pay for itself.

Weekly Details of Young Pigs

Weekly weighing may be advisable in the case of young pigs when precise details are required, but in ordinary circumstances fortnightly weighing will serve every purpose.

It is necessary, of course, that the pigs should be marked in some way so that individual weights can be compared on each occasion. When this is done the results, which are always interesting, may at the same time be very surprising on occasion. Armed with the knowledge conveyed by the weighing machine, one is able to determine whether the feeding treatment is right and whether it can be improved upon.

Otherwise one may persist in an unsuitable treatment for a long time before one discovers that better results could be and ought to be, arrived at.

In the case of pedigree pigs weighing is of the utmost importance—if only because the data thus obtained may be of the greatest value in effecting a sale. In the matter of culling, also, one gains information of great value, for the machine will always tell one without doubt which are the good "doers" of a litter and which are only second-rate in that respect. Whenever possible the weighing of pigs should be carried out the first thing in the morning before feeding, and care should be taken that all subsequent tests are made at the same time and under similar conditions. *Live Stock Journal.*

DIRTY UTENSILS ARE DANGEROUS.

Not every pig-keeper realises how much money he may lose by failing to keep his styes in as clean and sanitary a condition as it is possible to keep them. Pigs, admittedly, are not the cleanest of animals, but it has been proved over and over again that they thrive much better when not compelled, as they so often are, to spend their lives wallowing in filth.

There is one branch of the subject that deserves special mention, and that is the one which concerns troughs and other utensils employed in pig-keeping.

There is no easier means of conveying infection from one batch of pigs to another than by using anything which has been, or may have been, in contact with animals which have been suffering from some contagious disease. For this reason extreme caution should always be exercised when purchasing second-hand implements or utensils of any kind at a sale.

One can never be quite certain as to the history of these articles, and it is therefore always wise to scrub and disinfect everything before it is allowed to come anywhere near other stock. Hot water and a little carbolic acid are all that are needed, after which anything that has been treated should be given exposure to the air for two or three days before being used.

A Job for a Certain Day

In the same way, everything that is in constant use at home should be cleansed periodically, and it is well to fix a certain day of the week for this in the case of anything which is in daily use, so that there is less likelihood of its being forgotten.

Troughs should be cleaned outside as well as inside—the former operation, in fact, is really more important than the latter, for it is here that the germs of disease are most likely to accumulate. Many of the troubles which affect little pigs arise from the filth to be found on the outside of feeding troughs.

Equally important is it that all buildings should be disinfected from time to time, but certainly not less often than twice a year. In any case it is wise to carry out the process whenever one batch of pigs is got rid of and another is brought in to take their place.

Whitewashing alone is not sufficient to destroy the germs of disease or the vermin which lurk in out-of-the-way corners. *Live Stock Journal.*

"OUR GOOD COMPANIONS"

by

C. WARD-JACKSON

The number of pedigree dogs has increased in Malaya during the past decade. This increase was largely due to the formation of The Malayan Agri-Horticultural Association, the holding of its shows, and the creation of dog sections at such shows. Owing to the interest thus stimulated, The Malayan Kennel Association was founded in 1925, and publishes, quarterly, its official journal, *The Malayan Kennel Gazette*, of which the author of this article is honorary editor.

Soon after the Creation, a chasm broke open across the earth. Man was left on one side of it, the animal world on the other. The animals seemed undisturbed by this separation from man—all except the dog. He whined and ran up and down, seeking a way across. At last Man saw him and noticed the pleading look in his eyes.

"Come," he cried.

The dog sprang, but the chasm was too wide for him. He reached the opposite side only with his front paws, and hung there struggling vainly to get up.

Then Man put out his hand and pulled the dog to a safe position beside him.

"You shall be my comrade for ever and ever," he said. Thus reads the old legend about a very great friendship which began many, many years ago, when time was yet at its dawn.

Rudyard Kipling, in the story, The Cat that Walked by Himself, in *Just So-Stories*, made the woman say: "His name is not Wild Dog any more, but the First Friend, because he will be our friend for always and always and always."

The tale of this great partnership is the tale of an enduring friendship which has braved the change of climates, times and customs, and is very much alive to-day. The two central characters in the tale are first the dog, because, according to tradition, he was created amongst the creatures on the last day of the creation; then man, who was created later in the same day, to be a ruler over all the beasts of the earth.

Now dog is a word which comprises all varieties of the dog kind, from the feathery-tailed, proud-spirited morsels of Chinese royalty, the Pekingese, to the large, broad-headed, kindly-hearted St. Bernard, whose noble work and good offices on the snowy heights of Helvetia have been incorporated into legend. Man is a term no less broad, as it includes men of the east, of the north, of the west and of the south, most of whom have breeds of dogs of their own. To serve man better, to adapt himself better to our different needs, the dog has adopted every shape and has been able infinitely to vary the faculties, the aptitudes, which he places at our disposal.

Is he to aid us in pursuit of game? His legs lengthen inordinately, his muzzle tapers, his lungs widen, he becomes swifter than the deer. Does our prey hide under wood? The docile genius of the species, forestalling our desires, presents us with the Basset Hound, a sort of serpent, almost without feet, which steals into the closest thickets. Do we ask that he should drive our flocks? The same compliant genius grants him the requisite size, intelligence, energy and vigilance. Do we intend him to watch and defend our house? His head becomes round and monstrous, in order that his jaws may be more powerful, more formidable and more tenacious. Are we to use him in the tropics? His hair grows shorter and lighter, so that he may faithfully accompany us under the rays of a hotter sun. Are we going up to the North? His feet grow larger, the better to tread the snow; his fur thickens, in order that the cold may not compel him to abandon us. Is he intended only for us to play with, to amuse the leisure of our eyes, to adorn and enliven the home? He clothes himself in a sovereign grace and elegance, he makes himself smaller than a doll to lie in our arms or to sleep on our knees, or even consents, should our fancy demand it, to appear a little ridiculous to please us.

You shall not find, in nature's immense crucible, a single living being that has shown a like suppleness, a similar abundance of forms, the same prodigious faculty of accommodation to man's wishes. This is because, in the world which we know, among the different and primitive geniuses of life that preside over the evolution of the several species, there exists not one, excepting that of the dog, that ever gave a thought to the presence of man.

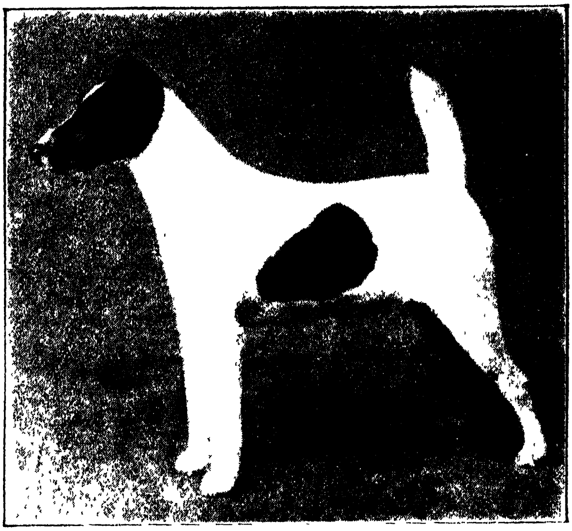
The literature of all nations abounds with references to the dog and to man's relationship with him. He was worshipped in ancient Egypt; venerated in ancient Persia, and loved by the ancient Greeks and Romans. Even in the Bible we are told that "the dogs under the table eat of the children's crumbs," which serves to show that the dog had won its way into the households of the Hebrews, who ordinarily hated dogs. The Mohammedan creed admits two dogs into Paradise—the dog of Tobit, and the dog of the seven sleepers, Katmir. Cicero praises the dog's fidelity and affection; Plato tells us he is a true philospher; Horace Walpole cannot think that two additional legs are any drawback to recommendations so wonderful as sense and fidelity; George Elliot advises that "a dog is a better friend than any Christian;" Bobbie Burns assures us that in his devotion to man, the dog puts the Christian to shame. Pope, in his *Essay on Man*, says of the Indian:

> He asks no angel's wing, no seraph's fire
> But thinks, admitted to that equal sky,
> His faithful dog shall bear him company.

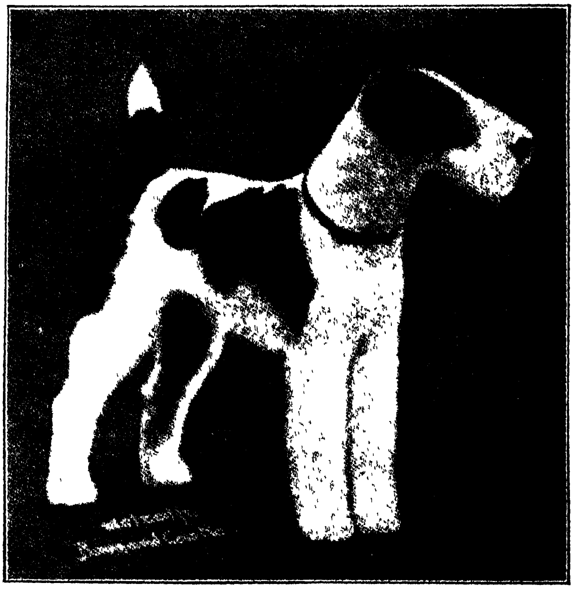
There are four lines of Crabbe, the poet, which tersely sum up the virtues of the dog: they read—

> With eye upraised his master's look to scan,
> The joy, the solace, and the aid of man:
> The rich man's guardian, the poor man's friend,
> The only creature faithful to the end.

A HEAD STUDY OF AN ALSATIAN



The Smooth Fox Terrier, *Warjax Delphinia* (by Ch. *Dunsrex* ex Ch *Delsmere Dainty*), the property of C. Ward-Jackson



The Wire-haired Fox Terrier, *Barney Knockout*

Let us leave these heights of this great friendship and regard the actual physical help that dog renders to man. We find he still helps the shepherd, as he did at the beginning of the friendship. It has been noted that when dogs are trained as workers, particularly if the same work has been followed from generation to generation, they seem in the end to develop almost human intelligence. No one who has ever witnessed sheep-dog trials can fail to have been struck by the marvellous aptitude and intelligence displayed by the dogs. Not only will a dog round up a flock of sheep in less time than three or four men, but it appears to know every animal under its charge. Let a stray sheep get in amongst the flock and the dog will notice it at once. Dashing in through the huddled mass, it will single out the stranger, manoeuvre it to the outer edge, and with a final yelp and snap will send it flying off to its own fold.

At St. Bernard's hospice in the Alps, the great St. Bernard dogs have for generations greatly assisted the monks and have rendered first aid to travellers overwhelmed by the terrible snowstorms which sweep through the pass. They are sent out fully equipped for this humane task, the restoratives being contained in a satchel strapped to the dog's side. Many a traveller would have perished miserably in the snow but for these dogs.

It is perhaps in the sledge dogs, such as accompanied Captain Scott in his attempt to reach the south Pole, that we find the best examples of dogs trained as workers. In the "frozen north" among trappers, Red Indians and others, they provide almost the only means of transport and to this day they are used extensively. Their instinct, due to long training, is almost uncanny. Each dog knows his place in the team and will take it of his own accord when a fresh start has to be made. The leader appears proud of his position, strongly resenting an attempt on the part of any other dog to usurp it. On arrival at a settlement, if the sledge is left standing, the runners become frozen to the ground. To attempt to free it by merely hauling would prove futile. It is here where the intelligence of the "huskies," as these dogs are called, comes in. The dog nearest the sledge first gives a spring sideways and a vigorous tug. In this manner the runners are released, and the team sets off again on its journey.

The North West Mounted Police, that splendid body of men which are so justly admired, maintain a team of huskies at every outlying station. A single member of the force will travel thousands of miles across the frozen north with his sledge and team of dogs to transport his provisions and equipment.

Questions often asked are: which is the most popular dog, and which the best breed for Malaya? Place and purpose should always govern the choice of a dog. It cannot be gainsaid that the most popular breeds of dogs to-day are the Fox Terrier and the Alsatian wolf dog. But is the latter the most suitable breed for the tropics? The answer is an emphatic "no," unless his owner has the time and is prepared to use his time, to care for him properly. The Alsatian does well here, if he is properly attended to; but he requires much care and attention, and, being so big, is costly to feed as compared with a dog of the smaller breeds. The Malayan climate has no seasonal variations, and the larger breeds of dogs are definitely not adaptable to it. Unquestionably, the ideal dog for Malaya is the Smooth Fox Terrier. While he, too, requires proper attention and feeding, he thrives with the minimum of trouble. He is a small dog, and does not therefore become a nuisance in the bungalow. His short, smooth coat is easy to clean, especially if dry-cleaned with suitable powder; he exercises himself, and, being so small, is cheap to feed. He is just a bundle of boisterous life; intelligent, an affectionate friend, a splendid watch dog, a good guard.

In this work-a-day world to-day, the value of most things is assessed on their utility. What use is the dog to man, unless man be engaged in the pursuit of farming or trapping, or is a trainer of racing greyhounds? The dog's greatest use and value lies in the happiness he brings into the lives of millions of people. Your dog believes in you more than you believe in yourself, however self-reliant you may be. Whatever the world may think of you, to one faithful friend you are the wisest and most splendid of beings—as wise as Socrates, as mighty as Napoleon. If encouragement and belief in one's powers are a help in moments of despondency—and who will say they are not? —no fortunate owner of a dog need ever be without them. Reflecting on these things, the significance of the saying of Sir Robert Ball, the distinguished scientist, can be appreciated. Sir Robert was asked to name the man whose work has conferred the greatest benefit upon mankind. He ignored the great scientists and physicians, statesmen, inventors, philosophers, artists and men of letters, and answered: "The primitive savage who first trained a litter of wolf cubs and started the race of domesticated dogs."

The Malayan Agri-Horticultural Association.

ANNUAL GENERAL MEETING.

The Annual General Meeting of the Association was held at 12, Barrack Road, Kuala Lumpur, on the 9th March, 1933. Mr. F. W. Douglas, the President, took the Chair.

Accounts. In dealing with the accounts Mr. Douglas pointed out that the 1932 Exhibition had resulted in a profit of $2,193.71 as compared with a profit of $1,036.62 in the previous year. He thought that was extremely good and definite proof that they were working on the right lines.

On the proposal of Mr. S. C. Colomb, seconded by Mr. V. L. Cachemaille, the meeting adopted the Balance Sheet and Accounts.

President's Report Mr. Douglas, in reviewing the year 1932, said that the outstanding point was the extremely successful Exhibition held as usual during the August Bank Holidays. While not proposing to deal with each section in detail, he would particularly mention the large proportion of local industries represented in the Trade Section which was extremely satisfactory and a step in the right direction.

The Schools Section appeared to be much better organised, due to the enthusiastic work of Mr. Sollis, the Inspector of Schools, Selangor.

A very much larger restaurant had been provided and an innovation was the Cabaret on the first night of the Exhibition which had proved quite a successful attraction.

Once again he had to express the appreciation of the Association to the Department of Agriculture for the very considerable assistance they had given in the general organisation of the Exhibition.

Office Bearers.

The meeting elected the following office bearers for 1933.

President.	Mr. F. W. Douglas.
Vice-Presidents.	The Director of Agriculture, S.S. & F.M.S. (Dr. H. A. Tempany, C.B.E.) *ex officio* H. H. The Raja Muda of Perak. Mr. John Hands. Mr. Choo Kia Peng, C.B.E.
General Committee.	Messrs. Pat Zilwa, S. C. Colomb, L. Y. Swee, W. Leggatt, G. H. Nash, Norman Grenier, E. W. Cooke, O. T. Dussek, C. Van Dort, F. M. Riley, V. L. Cachemaille, E. D. Butler, A. Van Tooren, H. M. Pendlebury, Eu Kee Eng, Dr. Quaife.

The meeting terminated at 7.45 p.m. with a vote of thanks to the Chair.

The Selangor Gardening Society.

The following extracts from the minutes of a meeting of the committee of the Selangor Gardening Society held on the 6th March, are published as being of general interest.

Show Prizes.

Meeting considers that the present arrangement with Messrs. Sutton & Sons, Calcutta, is unsatisfactory. It is resolved that suitable seeds be purchased before the Show from Suttons, Reading. Mr. E. D. Butler agrees to deal with the order for the May Show.

Exchange of Seedlings.

Honorary Secretary suggests that members interested in the exchange of surplus seedlings should be circularised and those applying should be kept informed of what seedlings are available for exchange from time to time. This is agreed to and the Honorary Secretary is asked to deal with this matter.

Lectures and Demonstrations.

1. It is noted that Mr. Birkinshaw will give the first lecture of the season at the Lake Gardens on Monday, 13th March.
2. Mr. C. R. Thurstan agrees to make his garden available for members of the Society on Monday, 27th March 5.15 p.m.
3. Mr. E. D. Butler agrees to make his garden available for members on Monday, 8th May at 5.15 p.m.

HORTICULTURAL SHOW.

The Selangor Gardening Society will hold a Show on Saturday, 13th May, 1933 at the Racecourse, Kuala Lumpur.

There will be nine competitive Groups including one for Malay School Boys only, which latter will be divided into two sections for vegetables and cut flowers respectively.

Non-members of the Society may enter for all classes with the exception of Group 2 which is reserved for members only.

Further particulars, copies of the Show rules and schedule and entrance forms can be obtained from the Honorary Secretary of the Society, Mrs. G. H. Nash, 744, Bellamy Road, Kuala Lumpur.

District Notes.

KAMPONG VINEGAR.

An enquiry in Malacca concerning the local preparation of vinegar elicited a few facts which are of interest, particularly as home-made vinegar is becoming almost unknown here owing to the cheap supplies of imported vinegar, which are now available at any village shop.

Preparation is chiefly from coconut, nipah or sugar palm juice, obtained by tapping the flower spathe. It may be prepared direct from the fresh juice, or from toddy made by the fermentation of fresh juice to which "ganja" has been added. In either case, the preparation is similar, the fermented juice being kept in stoppered jars or bottles until natural souring takes place, but the product from toddy is colourless, while that from fresh juice is pale yellow. The Malays are, however, prohibited by their religion from using the vinegar prepared from fresh juice until forty-four days from the commencement of the preparation, and are prohibited entirely from using that prepared from toddy.

Fruit vinegar is sometimes prepared at times when there are large quantities of surplus fruits, particularly rambutans and rambai. The fruit is skinned, and the juice expressed. After settling for half an hour the juice is decanted into a large bottle and allowed to ferment for at least a month.

Vinegar is consumed occasionally by Malays with fish and meat, and it is said that Javanese are particularly fond of it, using it even on their rice.

B.A.L.

A certain number of copies of *The M. A. H. A. Magazine* for January are still available and can be had on application to the Editor, P.O. Box 323, Kuala Lumpur.

ALUMINIUM

Diethelm & Co., Ltd.,
SINGAPORE.

THE
M.A.H.A. MAGAZINE

(The Official Organ of the Malayan Agri-Horticultural Association
and the Selangor Gardening Society.)

Vol. III. JULY, 1933. **No. 3**

Page.

FOREWORD. By His Excellency Sir Cecil Clementi, K.C.M.G., Governor of the Straits Settlements and High Commissioner for the Federated Malay States 86

EDITORIAL .. 87

THE TENTH MALAYAN AGRI-HORTICULTURAL EXHIBITION. By Dr. H. A. Tempany, C.B.E., Director of Agriculture, S.S. & F.M.S. .. 88

EARLY AGRICULTURAL SOCIETIES .. 91

AGRICULTURE.

SOME IMPRESSIONS ON LOCAL AGRICULTURE. By Miss K. Kay-Mouat .. 93

EXPERIMENTS AT CAMERON HIGHLANDS. By J. C. Drewet .. 96

MANUFACTURE OF CIGARETTE TOBACCO IN KEDAH. By N. H. Sands and Mohamed Murad .. 99

HORTICULTURE.

NEW OR INTERESTING ORNAMENTAL PLANTS. By R. E. Holttum, M.A., F.L.S. .. 101

SOME IDEAS FOR SMALL GARDENS. By Mrs. F. T. S. Newell .. 104

ORNAMENTAL TREES OF MALAYA. By R. E. Holttum, M.A., F.L.S. 108

CUT FLOWERS AND FLORAL DESIGN. By C. V. van Dort, F.R.H.S. 112

HINTS ON THE USE OF FERTILISERS. No. 3. VEGETABLES. By A. R. Westrop, N.D.A., P.A.S.I. .. 116

GARDEN PLANNING IN MALAYA. By F. Flippance, F.R.H.S. .. 119

MORNING FLOWERS. By R. E. Holttum, M.A., F.L.S. .. 126

GROWTH PERIODS OF FLOWERING-PLANTS COMMONLY GROWN IN MALAYA .. 128

MISCELLANEOUS NOTES .. 130

Page

POULTRY.

That Mysterious Poultry Disease. By L. Francke .. 134
Utility Poultry on the General Farm. By W. Powell-Owen, F.B.S.A. .. 137
Borneo Table Poultry Farm .. 139
Poultry Register .. 144
Correspondence .. 141
The Klang Poultry Association .. 144

MISCELLANEOUS ARTICLES.

The Control of Rural Malaria. By K. B. Williamson, M.A., Diploma Agriculture (Cantab.), D.I.C. .. 145
Hints to the Novice Horseman .. 151
Mendelism in its Simplest Form .. 154
Twenty-One Pig Products .. 155
A Million Calves in a Thimble .. 156
A Sacred Breed of Cattle .. 157
Patience needed in Training Polo Ponies .. 158

M. A. H. A.

Rules for Affiliation .. 160
Modification of Padi Competition at the Annual Malayan Exhibition .. 161

SELANGOR GARDENING SOCIETY.

Report of Flower Show .. 162

DISTRICT NOTES.

Balik Pulau Notes .. 164
Kelantan Agricultural Show .. 165

PRICE	**To Non-Members of the M. A. H. A.**	**20 cts. per. copy, or $1/- per annum, post free.**
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Foreword

BY

HIS EXCELLENCY, SIR CECIL CLEMENTI, K.C.M.G.,
GOVERNOR OF THE STRAITS SETTLEMENTS
AND HIGH COMMISSIONER FOR THE MALAY STATES.

It is proposed to issue a special "exhibition number" of the Magazine of the Malayan Agri-Horticultural Association, and I have been asked to write a foreword as a means of conveying a message to those present at the show which the Association is about to hold in Kuala Lumpur. I gladly comply with this request, because I feel much admiration for the work which the Association has done and is doing in Malaya, and because I have great faith in the utility of the exhibitions held under its auspices. They have set an example which has of late been followed with advantage elsewhere. For instance, there has recently been an Agri-horticultural Show in Singapore, another at Muar, in Johore, and I was present last month at similar shows held, for the first time, in the State of Trengganu, both at its capital and at Kemaman. Much is done by such exhibitions to encourage agriculture, horticulture and pastoral farming of all kinds. Those who attend the shows can see for themselves the best that is produced in their vicinity, and are thereby stimulated to greater effort. They also find in such exhibitions suggestions for new initiative. All this is very important, for the aim of one and all throughout the Malay Peninsula should be to make the land we live in self-supporting in respect of its staple food-supplies, and I hope that none of us will rest content until this has been achieved.

HIGH COMMISSIONER.

GOVERNMENT HOUSE, SINGAPORE.
1ST JUNE, 1933.

THE
M.A.H.A. MAGAZINE
JULY, 1933.

EDITORIAL.

At this time of the year we are naturally particularly concerned with the annual Malayan Exhibition which is foremost amongst the objects and activities of the Malayan Agri-Horticultural Association.

Elsewhere, Dr. Tempany, Director of Agriculture, points to the usefulness and importance of Shows in assisting in the development of the agricultural life of a country, and we would deal briefly here with the commercial aspect of the annual Exhibition.

It seems probable to us that business houses as a whole in Malaya must lose quite a considerable volume of business owing to their inability to display adequately their various commodities. The large stores have their windows, but it is doubtful whether, with the shopping and traffic conditions particular to this country, they receive the attention that the humblest shop window is given in Europe, and the import houses are almost entirely dependent upon advertising campaigns and bazaar salesmen.

It is not suggested that the latter methods are not satisfactory or successful, but the individual is apt to follow the line of least resistance and make his purchases without ascertaining if his requirements are obtainable from more than one supplier, and in these days of keen competition some form of display is, we think, necessary, and particularly in the case of the prospective outstation customer.

Without labouring the point further, we would point to the Malayan Exhibition as the ideal "shop window", and that this fact is being recognised is proved by the increased interest shown this year in the trade section by European business houses.

THE TENTH MALAYAN AGRI-HORTICULTURAL EXHIBITION.

BY

DR. H. A. TEMPANY, C.B.E.

Director of Agriculture, S.S. & F.M.S.

By the time this article appears in print the Tenth Malayan Agri-Horticultural Exhibition will be about to open its doors. In spite of the ever increasing difficulties due to depression it is hoped that this Exhibition may again mark a further step forward in the history of these undertakings.

Last year when it was decided to hold the Ninth Exhibition critics were not wanting who stressed the view that Exhibitions, at a time like the present, were a mistake and represented an unjustifiable waste of time, energy and money. The Malayan Agri-Horticultural Association and the Department of Agriculture felt that such a view is distorted and unjustified and that it signified lack of apprehension of the true implications of the situation and of the role which these Exhibitions are intended to fulfil.

The world is faced at present with an economic crisis the magnitude of which has not been paralleled and of which the equal will, it is hoped, never be seen again. It is plainly the duty of every member of the community in every country to endeavour to assist to the best of his or her ability in tiding over this crisis. Whatever may be the merits of world wide free exchange of products as an ideal economic system, there is no question that at present the restriction on trade existing all over the world combined with the unbalanced ratio of values of exchange for different staples have led to a position in which the country which depends in the least degree on imports of essential products and can show the greatest range of exports is in the most favourable position. Accordingly the only safe policy appears to be steady and consistent efforts towards the broadening of the economic basis of the country, the extending of its range of production, the organisation of home markets and the raising of the standard of quality of the produce that is turned out, both agriculturally and industrially.

There is no means of assisting these ends of greater utility than the holding of periodic exhibitions. Efforts to curtail activity in this direction imply neglect to utilise one of the most fruitful methods of attacking the problem. Exhibitions and shows stimulate competition, give birth to new ideas, raise the standard of produce, promote helpful discussion, spread information concerning improved methods of production and new lines of development, help to create markets for new products, and lead to increased trade. It is true that they need to be combined with activities in other directions, but in any plan for extending the economic basis of a country the holding of shows must play a leading part. To regard them as a luxury only to be indulged in prosperous times is to take an entirely mistaken view of the situation, and if that view persists it is an indication that the country is blind to the implications of the situation and in consequence is likely to fall behind in the struggle for existence.

It is, however, obvious that, especially at present, in organising shows regard must be had to economy combined with efficiency; lavish display is to be deprecated and exhibits should be designed with a view to stimulating production and trade. Every exhibit and every display should have its own message to convey and that message should be readily comprehensible. This entails that promoters should have a clear picture before them of what shows are intended to achieve. The Malayan Agri-Horticultural Association have of recent years realised this with increasing conviction and each year closer attention has been given to the question of schedules with a view to making them more comprehensive and more directly utilitarian; on this occasion the Association has compiled a series of judging standards to enable the exhibits shown to be classified and the awards adjudicated with the greatest efficiency. Many other points are also being discussed, and as years go by it is hoped that an ever increasing standard of excellence may be achieved.

The results of the last show must be regarded as a vindication of the correctness of the view expressed above, numerous examples of benefit derived therefrom have been forthcoming during the year and it is believed that the fruits thereof will be shown by a marked further advance this year. It is satisfactory also to notice that the idea that shows should play a definite part in the policy of expansion is gaining ground in the districts. In 1931 all activities in relation to district shows were suspended. In 1932, in spite of the ever increasing depression, the idea that shows can and do serve a beneficent end had gained ground and three district shows were held in addition to the central show at Kuala Lumpur. This year marked further progress is visible. For the first time for many years an agricultural show has been held in Singapore comprising exhibits from that island and from South Johore, while at the time of writing it is known that at least seven other District Shows will be held in Malaya, including a number in the Unfederated Malay States. This gives a grand total of at least nine shows for the whole of Malaya, a total which has not been exceeded for very many years past. This may I think be taken as a definite indication that the views that are set out above are gaining widespread acceptance.

But if they are to bear to the full the fruit that may justly be expected from them continuity of effort is essential. It must be recognised that in times of stress even more than in times of prosperity Agricultural Shows do a great deal of good but it must also be recognised that an essential requisite is continuous effort and not spasmodic endeavour. Unless the necessary continuity of policy can be assured success can only be partial.

The Malayan Agri-Horticultural Association may fairly lay claim to constitute a leading factor in ensuring this continuity. In 1931 had it not been for the Association, it is at least probable that no show would have been held in Malaya at all, and it is in large part the example and precept of the Association which is responsible for the marked revival of interest in the question which has taken place in the last two years and for the increasing apprehension of the value of shows in the existing crisis.

Definitely the existence of a central organisation which concerns itself primarily with organisation of shows is a valuable asset; without it the needful continuity is bound to become much more precarious. Formerly the Association had many branches in various parts of Malaya but in the depression these have languished and died.

Is it too much to hope that in view of the proved needs of the situation the coming year may witness a revival of activities and that branch associations may once more arise which will assume in part responsibility for carrying on and extending the policy of holding shows the importance of which is now becoming realised?

H. Tempany

Director of Agriculture,
S.S. & F.M.S.

Kuala Lumpur,
24th April, 1933.

EARLY AGRICULTURAL SOCIETIES.

The " Honourable the Society of Improvers in the knowledge of Agriculture" in Scotland was the first institution of its kind in Britain. Founded in the year 1723, it numbered over 300 members, among whom were some of the most eminent Scotsmen of the time. Its revenue was very small, and its best work seems to have been done by collecting information concerning the management of farms and advising members as to the best means of improving their lands. The Society of Improvers did not, however, continue long in existence. It came to an end about the year 1743.

Enter the Royal Dublin.

The first of the Societies to be established on a footing which secured its permanent existence was founded in Ireland. Mr. Prior, of Rathdowney, in Queen's County, receives credit for the idea of establishing what is now known as the Royal Dublin Society. This was formed so far back as the year 1731, to carry out the objects expressed in its title; these were wider than those of the present Royal Dublin Society.

The object of the original Society was "to improve husbandry, manufactures and other useful arts and sciences"; and the fact that, in 1741, when it had reached the eleventh year of its existence, it was granted a Royal Charter, sufficiently indicates that the Society had accomplished useful work and had made good its claim to recognition as a factor in Irish industrial progress.

In 1761 the Irish Parliament voted the Society, which had theretofore been supported entirely by the landed proprietors, an annual grant of £200, and this vote was increased from time to time till, in 1800, the annual contribution from Government reached £15,000.

The earliest English Society was not founded until 1777, forty-six years after the Dublin Society had been established. The year named saw the foundation of "The Bath and West of England Society for the Encouragement of Agriculture, Arts, Manufactures, and Commerce," now "The Bath and West and Southern Counties Society," whose annual Show is one of the principal events of its kind in England.

Appreciated in Those Days.

Husbandry at the time these societies were founded was the most important industry of the kingdom; it furnished employment for the largest proportion of the people; it represented the greatest proportion of the nation's wealth, and was the industry whereon the country depended for its food, for the timber required to build ships for its defence, and, to a considerable extent, for materials for the manufacture of its clothing.

We find in a list of premiums or prizes offered by the Bath and West of England Society and others, "For the finest piece of blue cloth from English wool"; "For the finest piece of white kerseymere from such wool";

"To the person who shall plant in the best manner the greatest quantity of land, not less than two statute acres, with oak plants not exceeding six feet in height"; and similar inducements to the landowner who should plant the greatest number of ash trees. It would be easy to collect many examples of the industries connected with agriculture and encouraged by the societies, but the above will serve to illustrate the scope of their work in earlier days.

The Bath and West Society appears to have remained the only association of the kind for some years. In 1793 the Board of Agriculture was established by Act of Parliament with a grant of £3,000 per year from the public funds, and during the ten or twelve years ensuing Agricultural Societies were established in many parts of the country.

Agriculture.

SOME IMPRESSIONS ON LOCAL AGRICULTURE.

BY

MISS K. KAY-MOUAT

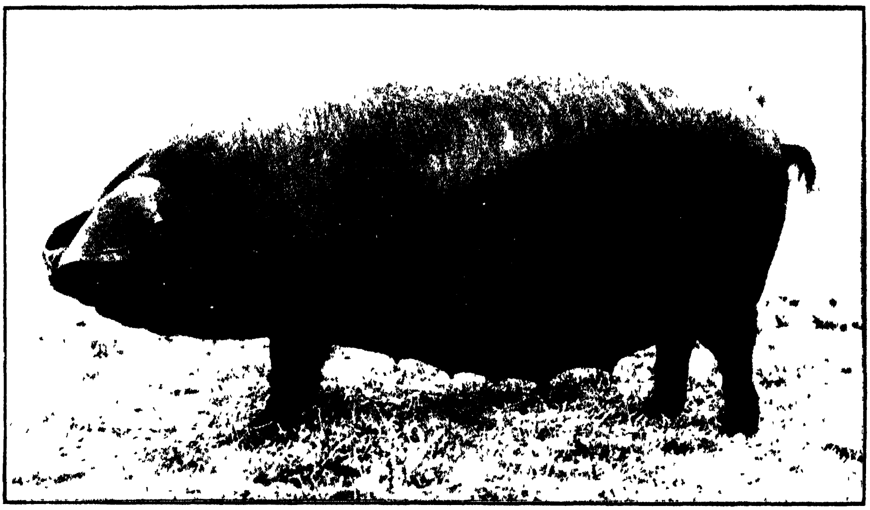
The ultimate prosperity of a country depends upon its primary wealth, of which agriculture is an important source. Therefore the agricultural status is of vital importance to every Government, and their Agricultural Research Stations, with their powers of development and organisation, constitute a potent factor for rural and industrial employment. A traveller can gain a fair knowledge of the conditions of agriculture in a country by motoring through the rural areas and observing the cultivation of the land, the crops grown, and the class of stock; they all indicate the industry and wealth of that country. Thus any one passing through North Italy is struck by the industry of the peasants, who cultivate all available land. Even precipitous slopes, which would be deemed impossible for cultivation in England produce terrace upon terrace of finely cultivated vines. The absence of pasture land reflects on the stock; grazing cattle are seldom seen, herds of pigs are equally scarce; all one sees is a tethered beast as thin as a rake, an eye-sore to a pedigree breeder.

In Malaya a different picture presents itself; a land of vast semi-cultivated acreages, rubber estates, coconut plantations, and padi fields, interspersed with innumerable small holdings, dwindling down in size to mere scattered shanties amongst a few banana plants with a possible cow or two, some goats, and the ubiquitous poultry, often sired by a fine game cock-possibly kept for a dual purpose.

Where Governments can step in and render invaluable service is in the scientific selection of varieties and the preserving of the purity of the better types through state institutions for agriculture and horticulture alike.

Sungei Besi.

It is impossible for any industry or any country to stand still in world competition today—the rubber plantations which will pay will be those scientifically and economically managed; others will fail. Pedigree breeding is just as important a factor amongst plants as it is amongst stock and can increase the yield of every crop. It is an education to go round the Government Research Station at Sungei Besi and to see the efficiency of modern machinery in the extraction of palm nut oil. The factory is only a small one but the drums of oil filled daily ready for shipment show the possibilities of the industry. This is only one side-line of the work carried on at this Government station, which runs to about 800 acres in all, but of which only some 180 acres at present are under cultivation. The experimental plots here are well planted, well cultivated, and methodically set

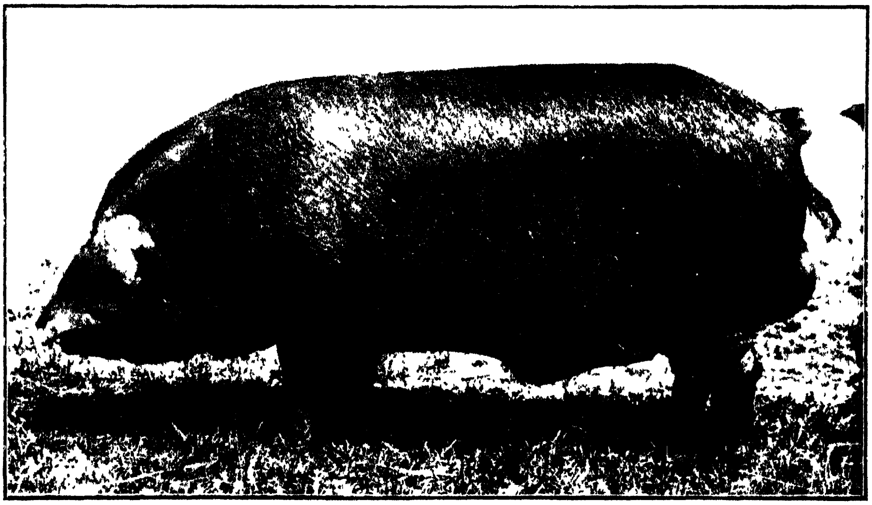


McHeather Susan 2nd. Winner of 1st prize at R.A.S.E. Show in 1919.
Bred and exhibited by Miss Kay-Mouat.

This sow was selected by the Board of Agriculture and Fisheries to demonstrate a typical Bacon pig and is still used by them in their demonstrations.

A life sized model of this sow was sent to the Trades Exhibition at Ottawa of the Board of Trade.

This photograph was taken when under a year old— in farrow for her first litter.



Cornwood Someday—Winner at the Royal Show.
Bred and Exhibited by J. H. Glover.

out, which speaks volumes for the management of the station. Another interesting section of the work at Sungei Besi was the tea factory, with an up-to-date plant, a fine drying shed, and a large packing department which was turning out large quantities of tea daily in most attractively sealed and graded packets. Malayan tea is not widely known outside the peninsula, but those who have sampled the blend speak in its favour and those who have difficulty in procuring a brand to their liking should sample it. The plots given up to the tea section showed fine sturdy bushes, which compare well with the plantations in Ceylon, only of course on a smaller scale.

The horticultural side throughout is well developed, the crops grown show a wide assortment and the cultivation is good; unfortunately we had no opportunity that day of seeing the laboratory work, but there is little doubt that where the practical side is so well organised the theoretical side must be equally well equipped.

The research work being done in Kedah on the padi is worth mentioning here, and compares favourably with the agricultural experiments which are being carried out at present on wheat and other cereal crops in Cambridge.

Stock - Breeding.

The stock-breeding department did not give such a favourable impression, possibly this section is suffering through lack of funds; the stock was indifferent in quality and the experimental work on too limited a scale to be of any economic value. In the pig section there was lack of uniformity in type, and most of the animals were poor specimens in so far as they represented pedigree breeds. The experiments in cattle were restricted to one cross, the Frisian bull in the native cow, a cross which theory surely would not endorse. The native cattle in Malaya are uniform in type with good, compact carcasses, a dual purpose breed whose milking qualities require bettering. The bullocks, whether used as beasts of burden to cultivate the land or as beef, can gain little of an English or European cross, but might lose much. These native cattle are docile and tractable, a quantity which should be carefully preserved—but likely to be lost with a Frisian cross—they are essentially a *dual purpose* breed and should be mated to a dual purpose sire. No cross should be contemplated with either a purely milking breed or with a beef breed, but a dual purpose animal should be used strong in the milking qualities and those other characteristics desired, wherein these native cows are most lacking. A mating with a Guernsey or an Ayrshire bull would be suitable; or possibly a Welsh or Kerry, for those districts where climatical conditions are most trying. The bull used for crossing should be an animal of their own conformation, short in the leg, fine in the bone, of deep carcass, of a quiet and amenable nature and bred from a dam and a strain with well developed udders; for milking properties must be a dominant feature on the sire's side if the offspring are to inherit the characteristic.

One set of experimental matings is of little value where cattle are concerned, it is the offspring of a number of comparable and successive matings through several generations alone which will justify any system of cross-breeding. Where a Government Agricultural College exists the students should have the opportunity of simultaneously watching these various matings with their successive offsprings, and draw their own conclusions from valuable statistics.

The breeds mentioned above would probably give more uniform offspring and commercially better animals than those from a Frisian bull, whose uncertain temper and large framework are unsuitable to be grafted into the docile cattle well fitted, when lightly shod, to draw carts through the busy thorough-fares of Singapore. The Frisian is a slow developer, a gross feeder, yields indifferent beef and would not improve the local cattle generally.

A factor which is just as important as a selection of breed is "strain" within that breed. Unfortunately through lack of system at home amongst pedigree breeders too little attention is given to this all-important factor, which makes it risky work for an outside buyer. In selecting one of the above breeds for mating with the Malayan cattle the choice should rest on a dual purpose animal in the breed with dominant milking qualities. It would be most unwise in a tropical climate to tax any cow for a large yield such as a 1000 gallon milk average; 600 gallons of milk per cow per year is all that should be aimed at out here, which would be a vast improvement on the present position.

The water buffalo probably has altered little during centuries, a beast no doubt with sterling qualities and worthy of scientific breeding. Its milking qualities apparently have not been developed and might have valuable properties—a subject worth taking in hand.

In conclusion may I stress the point that in all breeding the method adopted is to cross-breed extremes for need varieties but improvement alone is the desideratum select a typical bunch of females as near similar as possible and introduce the improvement by mating with a sire of a breed with similar consummation and dominant in the desired new features. The accompanying photograph shows correct mating for preservation of type—little is gained by mating extremes in the evolution of domestic animals, and it is a policy which should be condemned in pedigree breeding.

EXPERIMENTS AT CAMERON HIGHLANDS

BY

J. C. DREWET.

During six years residence on the Cameron Highlands with temporary houses at Jor, Renglet, Habu and Tanah Rata for the construction of the main road from the 17th mile to the 38th; one gathers considerable knowledge of local conditions especially when one has made gardens at each construction camp.

The chief obstacles to complete success were first the cut-worm, next the lack of lime as a corrective to sourness of the soil, and finally, at Tanah Rata, the multiplicity of leaf diseases and insects which damaged crops and practically ruined the tomato crops.

The first of these, i.e. the cut-worm, is very serious in light friable soils which carry a high percentage of jungle mould—the so called peat, but is not so often found in moist clay soil. No attempt was made to find out exactly what the worm lived on, but the impression was formed that in the absence of young green shoots, it could subsist on dry twigs and other undecomposed woody matter. This was assumed, because plots of ground were left bare of all vegetation for three months in an attempt to starve them out, and then sown with beans, yet the moment the first green shoot appeared, it would be cut off. There was no accurate observation of the foregoing so there is the possibility that the pest travelled to the food from surrounding ground as soon as it appeared.

The pest was difficult to deal with because soot, lime etc. had no effect. The most positive destructor proved to be the products of petroleum, but these were equally deadly to the plants. Subsequently it was found that pyrethrum disolved in acetone to the proportion. 10% ryrethrum, 80% acetone, 10% water, provided a concentrate which if used at the rate of one pint to 100 gallons of water, made an effective insecticide which did not damage the plant, and was also of great value against other pests, such as caterpillars etc.

The second disadvantage, that of soil sourness, remained serious in that it is expensive to transport lime from the plains. Traces of calcite were found at Renglet and at mile 33 which the Director of Geology (Mr. Scrivener) agreed could be used in its natural state, but the quantity available was insufficient. Much however, can be done with ash.

The third problem of sucking insects, wilt, leaf curb, etc. will always be with us as there is no cleansing frozen period such as obtains in Canada during the winter which allows the agriculturist to start with a clean sheet in the spring. The secret of success is to begin spraying the healthy plants before any signs of pests appear.

The main experiment which is being carried out in Kea Farms is the creation of permanent pastures of temperate zone grasses. The first lot of seed consisted of cock-foot, English Rye and Italian Rye and red cloves. The cost of this first import was £3-16-0 at roughly fifty cents per lb. Almost every seed must have germinated, because it was on the result of this small purchase that the stock subsisted for nine months; which fact is of sufficient significance.

A second consignment of seed to the value of £10/- was received in October, 1932, and is just coming to the cropping stage.

A third lot valued at £100 was purchased in January 1933. Should the two second purchases approach the first in food value it is difficult to estimate how great will be the carrying value in units of butter-fat per acre of Highland country as the potentialities seem too extraordinary to be used. The future fortune of the farm depends entirely on these grasses, as, if they hold and multiply, it will be possible to graze horses, cows, pigs, geese and turkeys at a minimum of cost.

It has been held by the Agricultural Department that the test being carried out with sheep is of no value and is doomed to failure, and that the land is too steep for cattle: too steep for the grasses to hold as the stock will tear them up when walking down hill.

This is fair criticism, and the probabilities must be recognised, but fourteen months of experiment are proving them untrue. The best turf on the estate is the oldest. The sheep are carrying inches of fat on their backs and are due to lamb in July—August. The cattle remained perfectly healthy grazing only the imported grasses, and the one set-back occurred when the cattle were sent to the Golf Course. Here, within two weeks pleura pneumonia set in which developed fatally in three head of stock. Upon the return of the animals to the farm and the good grasses all illness ceased.

The proposal to create other farms in the Highlands is not meeting with approval from the Government of Pahang which is strongly inclined to tea and coffee, but with the latter we have the ominous fact that the Experimental Station at Tanah Rata cut out their principal plot of coffee within three months of its coming into bearing because of Himalayan disease. And as for tea, we have only to mention the word to any merchant to be given facts and figures as to the state of the market which appall. The prospective local market is effectively covered by the potential output from Boh Plantations, and the alternative of the London market means struggling against the $250,000 factories of Java. These have their experts with 600 hands at work in the factories alone. Without similar equipment we cannot hope to compete. It is futile to trust to our higher elevation alone, and who is prepared to invest half a million dollars for an estate large enough to justify a quarter of a million dollars factory on the meagre evidence available to date? Not only this, there will be the great difference of labour cost to compete against as the Dutch can employ coolies at $7-50 per month to our lowest slump wages in the Hills of $15/- per cooly. The "inveterate" tea-planter will criticise these statements and offer to build a factory for $15,000, but our rivals have factories which ensure that every leaf becomes tea, and the best tea possible with that particular leaf, whereas the $15,000 factory will be apt to turn the best tea into straw on any odd day of the week.

Government will be well advised to encourage farming since there has not been any proof of failure to date and much to the contrary while the new venture has huge possibilities. With our milk bill running into millions annually; with our egg, pork, bacon and ham totalling colossal sums, the new avenues are worthy of encouragement, and the more particularly as not one critic can produce proof of his prediction of failure because there are none with experience in this new thing: new in Malaya at the high elevations.

Moreover, there is this to remember: that nothing is being done which cannot be undone. Any kind of plantation has to have the jungle felled, the timber cleared, roads and contours run, grass planted, buildings erected; and if this is done on a farm which proves a failure when adjacent tea and coffee estates flourish it will be simple to switch over with little loss. But for the moment all the evidence is that the opposite will happen.

THE MANUFACTURE OF CIGARETTE TOBACCO IN KEDAH.

BY

N. H. SANDS AND MOHAMED MURAD.

Recently quite a thriving new trade in the manufacture and sale of cigarette tobacco known as 'tembakau hulu' has been developed by Chinese residents in Kedah. This industry was encouraged by the high import duties on foreign grown tobacco and the absence of any excise restrictions on tobacco grown and manufactured locally.

In most districts of the State, tobacco, chiefly of the Deli type, is cultivated by Malays and Chinese and the mature green leaves are sold to manufacturers at prices ranging at the present time from $3 to $5 per pikul (133⅓ lbs).

Efforts have been made by the Department of Agriculture to obtain details of the methods of preparing tobacco from fresh leaves, and with this object in view, the Assistant Agricultural Officer (Mohamed Murad) who was stationed in South Kedah was specially deputed to obtain as much information as possible concerning the industry in his district, whilst the senior writer visited manufacturers in the Kubang Pasu district of North Kedah.

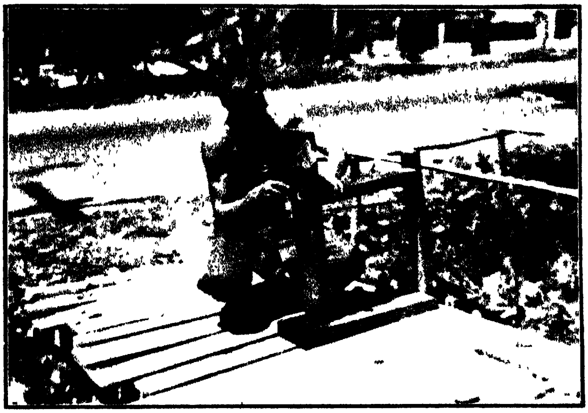
Methods of Manufacture.

On arrival at the factory the green undried leaves are stripped of their midribs and arranged in small flat heaps which when rolled tightly by hand, form cylindrical compact bundles from 6″ to 9″ long and 2″ to 3″ in diameter. The leaf is now ready for cutting. This operation is performed on an almost square wooden frame consisting of two upright pieces of plank securely fastened at the base. Between these is fixed a slightly inclined grooved board which slants towards a round hole about 3″ in diameter situated in the main and front upright. The outer surface of this plank is iron shod.

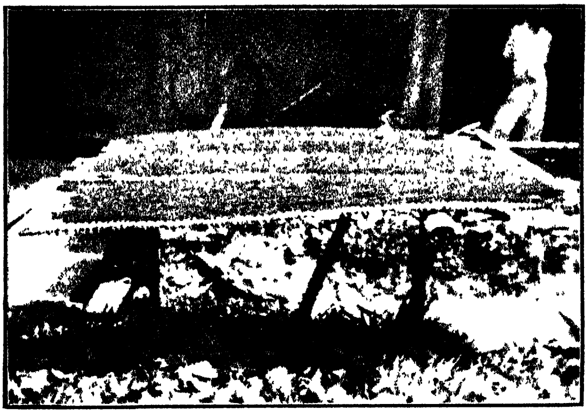
A bundle of leaves is placed in the grooved board and gradually thrust forward towards the opening. When a small portion of the bundle protrudes through the hole a well sharpened Chinese vegetable knife is worked perpendicularly across the surface of it making very thin clean cut slices of leaf. It is stated that a skilled workman can cut in a day one pikul of green leaves which is equivalent to 9 to 12 katties of 'tembakau hulu.'

The finely sliced leaves are then spread in a thin even layer on light bamboo frames and dried in the sun. These frames vary in size, 5 ft. x 2 ft. being about the average dimensions.

The drying process is entirely dependent on weather conditions and may occupy a period of anything from 2 to 6 days. The tobacco is left out during the night but care is taken that it is not subjected to rain,



Cutting the green leaves.



Drying on bamboo frames.

General view of drying.

although dew is not considered to be detrimental to it. During the daytime the tobacco is watered sparingly by means of a watering can with a fine rose. Special ingredients are mixed with the water in order to give the tobacco an agreeable flavour.

A certain amount of clove and cinnamon are sometimes finely pulverised and mixed with the water. Another mixture consists of clove, brown sugar and tamarind boiled and strained before being used. The proportions in which the different ingredients are used could not be ascertained and it was with much difficulty that the information on the subject given above was obtained.

After drying, the tobacco is graded and make into bales or bundles, each weighing roughly 9 tahils.

Sale of Tobacco.

The sale of this tobacco generally takes place at the shops of the manufacturers, but where quick returns are required it is sent to the larger towns to be disposed of. In this connection it may be mentioned that quite large quantities are sold at the Weekly Fairs which are held in many parts of the State, the Malays acting as middlemen.

Taking the cost of the green leaves of $4 per pikul and the price realised for the 10 katties of prepared tobacco obtained from them, namely, $7, the profit after deducting the cost of labour and overhead charges, is probably not more than $2 per pikul of the green leaves dealt with.

Quality of Tobacco.

The tobacco as sold is rather inclined to be dry, although liked by Malays for smoking in prepared nipah leaves.

It is said that the tobacco smokes well but is inferior to the imported 'tembakau jawa' which it so closely resembles, both in texture and method of manufacture; this is probably explained by the fact that the tobacco is sold as soon as it is made and undergoes no process of fermentation in storage as would be the case to a certain extent in shipments from Java.

In the manufacture of 'tembakau hulu' there is no waste and any grade of leaf can be used. All grades are therefore purchased by the manufacturers but better prices are given for a good class of leaf.

Although the mechanical side of the preparation of the leaves is carried out proficiently, the mixtures used to improve the quality of the tobacco are not satisfactory, nor is sufficient attention given to the storage of the product. The quality of the tobacco would, without doubt, be improved considerably if stored for at least six months in closely packed bales before being used.

Three photographs are annexed which illustrate the method of cutting the green leaves and drying the prepared tobacco.

Horticulture.

NEW OR INTERESTING ORNAMENTAL PLANTS

BY

R. E. HOLTTUM, M.A., F.L.S.

Director of Gardens, S.S.

Tussacia pulchella.

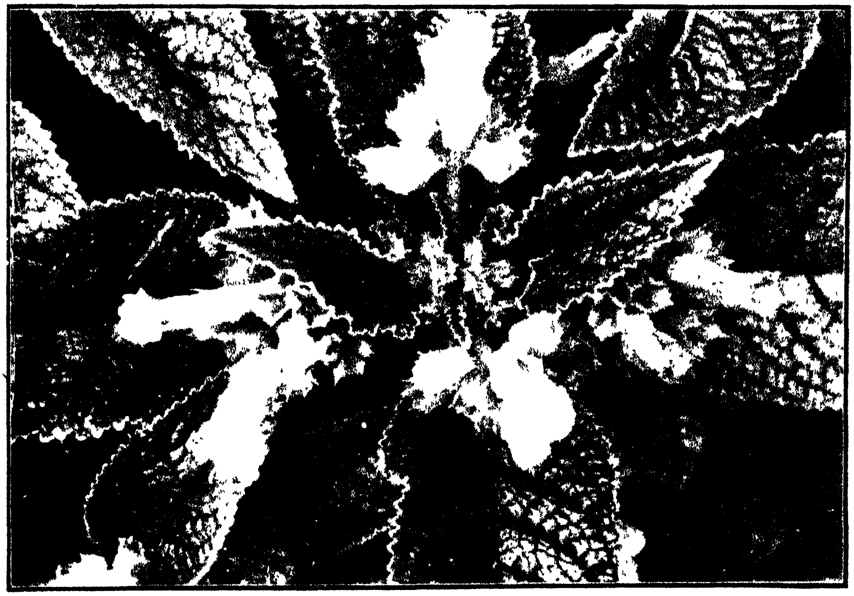
This is a pretty dwarf subherbaceous species which has recently been introduced from Kew, and appears to be thoroughly hardy as a bedding plant in sunny places in Singapore. It is native of the West Indies and was introduced to European hothouses more than 100 years ago. It is surprising that it has not been introduced to the East earlier; it is not mentioned in Macmillan Tropical Gardening and Planting, nor is it recorded as occurring at Buitenzorg.

The plants growing in Singapore have been planted out in a small bed for several months past, and are still less than one foot high, though flowering freely. The leaves are in opposite pairs, unstalked, about 4 inches long by 2 inches wide, narrowed to base and apex, the edges finely toothed, the surface raised between the veins, rather bright green, glossy but somewhat rough to the touch owing to the presence of short stiff hairs. The stems are pale green, rather thick and fleshy, square in section. The flowers are borne in the leaf axils, in groups on stalks 2 inches long. Each flower has a separate stalk about an inch long. Its calyx is orange (green at the base only), bell shaped, with 5 teeth at the apex; between the teeth are ridges. The corolla tube is softly hairy, twice as long as the calyx (about an inch long) yellow, expanding at the apex into a small cup-shaped bright yellow flower with five rounded petals. On the outer side of the tube is a crimson blotch; the bases of the petals within have crimson lines, three to each. Within the tube are 4 stamens and a two-lobed stigma. Though the flowers are small, they are numerous, and the orange colour of the calyx adds considerably to the general colour effect.

Though this is not a particularly showy plant, it seems likely to flower freely and continuously, and to be useful for bedding purposes. These characters and its dwarf size are likely to make it very useful in Malayan gardens. It is easily propagated from cuttings of its fleshy stems.

Pitcairnia latifolia, var. furfuracea.

This very handsome species has recently flowered very freely in the Penang Gardens. It is member of the family Bromeliaceae, to which the pineapple belongs. The family is confined to the American continent. The genus was named after W. Pitcairn, a London physician. The name *latifolia* means broadleaved, and *furfuracea* refers to the white powdery covering on the lower surface of the leaves.



[*Above:*] Small bed of Tussacia pulchella.
[*Below:*] Plant of Tussacia pulchella seen from above.

Yucca aloifolia in the Waterfall Gardens, Penang.

The plant in flower reaches a height of from 5 to 6ft. Most of the leaves are in a tufted group at the base of the stem, with a few distant ones above becoming smaller as they ascend. The leaves are long, narrow, more or less strap shaped, the base concave and clasping the stem, the blade becoming limp and drooping at about half its length; upper surface medium to dark green, smooth and glossy, lower surface covered with a fine white fur which is easily rubbed off; base of leaf spiny on the edges for about the first 6 inches, the spines dark coloured and stiff, the rest of the leaf usually without spines, the apex ending in a long narrow tail; length of leaf about 3—3½ ft., width up to about 1½ ins.

The flowering stem is stout, green, with a sparse covering of the same white fur as on the lower surface of the leaves, with reduced leaves at intervals along it. The flowering portion is in the form of a narrow conical spike about 16 ins. long with 4—6 branches at its base, each about 8 ins. long, the main central spike about a foot long, reddish coloured. The flowers are borne close together, on erect reddish stalks usually a little less than ½ in. long, each with a narrow green leafy bract a little longer than the stalk. The flowers are scarlet, the lower ones opening first, about 2—2½ ins. long. The calyx consists of a short tube bearing 3 narrow sepals about 1 in. long, closely pressed against the petals. There are three petals, separate from each other but more or less twisted together, narrowly oblong with a short point, about 2½ ins. long and ¼ in. wide, each with a small toothed scale at the base inside. There are six slender stamens, with long anthers containing much yellow pollen. The style is a little longer than the stamens, with 3 short reddish stigmas closely twisted together.

The large inflorescences of brilliant scarlet flowers, on their tall stalks, are most impressive. The plants seem to prefer a light soil and full sun, and will respond to manuring. The flowers are produced chiefly in the dry season, and it is probable that the plant will flower better in the north than in the south of the Peninsula; it has not however yet had a thorough trial in Singapore. Propagation is by suckers which are produced at the base of the stem. A limited supply is available at the Waterfall Gardens, Penang.

The Yucca or Adam's Needle.

Yucca plants attracted the attention of early visitors to North America, and more than one species was cultivated in England before the end of the 17th century. About 30 species are now recognised as belonging to the genus, and they are distributed from Mexico northwards. They belong to the lily family. Their habit of growth, with a rosette of narrow stiff sharply pointed leaves 18 inches or more long, mounted by a tall inflorescence of beautiful large bell-shaped pendulous white or cream flowers, makes them extremely handsome, and in suitable climates they are used with great effect for decorative purposes. In seasonal climates good plants will flower at about the same time every year. The Malayan climate is however rather wet for them, and the only species grown here seems to be very uncertain in flowering, at least in Singapore. In Penang recently I saw a number of plants all flowering together, and it is possible that Yuccas usually flower about April in Penang.

The Yucca usually grown here is *Yucca aloifolia.* It is native of Mexico and adjacent regions. Its stem is not very stout, and may reach several feet in length, sometimes branching at the base. The leaves have a thin pale edge, usually finely toothed at least towards the base. The inflorescence is erect and branched, and is very beautiful even during the day when the flowers are closed. The flowers open in turn in the evening and each remains open for one night, during which it has a heavy perfume. Like other pale coloured scented night flowers, Yuccas are moth pollinated. In their native country they are pollinated by a particular kind of moth only, and the extreme specialisation of the moth and flower to each other is one of the most remarkable cases known. The stamens and stigma of the flower are so arranged that self pollination is impossible. The Yucca moth emerges from its pupa at the season of flowering, goes to the open flowers in the evening, collects pollen from the stamens, lays its eggs in the ovary of the flower, and then places the pollen on the stigma. This pollination ensures that the fruit will develop and provide food for the larvae of the Yucca moth. The larvae eat some of the young seeds in the Yucca fruit, but some seeds are untouched, and serve to reproduce the plant. The moth is provided with specially modified mouth parts which hold the pollen. Where the moth does not occur, as in Malaya, the flowers are not pollinated and no seeds are produced. It is however possible that even artificial pollination would not secure fruit production in Malaya, as for some reason or reasons plants from drier climates often fail to set fruits here.

Young plants of *Yucca aloifolia* are rather like Aloes and Agaves in growth and have a pleasant formal shape, but they develop rather long stems and when old become rather untidy. They are well worth growing in a sunny place where there is room to let them have their own way; they are probably best in sandy ground near the sea, or at the back of a sunny rock garden. They are propagated from suckers which develop at the base of old plants.

SOME IDEAS FOR SMALL GARDENS

BY

MRS. F. T. S. NEWELL, SINGAPORE.

Bricks.

Bricks are most useful in any garden, but especially in a small garden where no kebun is kept, or perhaps only a part-time man to cut the grass and hedges. It is well worth investing in 200 bricks for the many uses they have and the amount of digging which they save. Many plants do better in brick beds, which can be of any shape or size. The simplest form is a round brick "tub", made in the following way. Place six bricks in a circle on the ground and then another circle on top with the length of each brick across the joints of the previous row, and so on alternately until you have a round tub six bricks deep and six bricks round. Then put crocks, broken bricks, pots or stones, to the depth of a brick or more inside, a few dry leaves to cover the crocks, and then fill with good soil mixed with some well-decayed manure and leaf mould. Thus in a few minutes you have a small flower bed, easily moved if you want to alter its position, and much more easily made and looked after than a flower bed in the ground. These brick beds and tubs look very nice in any garden, as the bricks soon take on a nice weathered appearance, and interesting mosses and ferns appear in the crevices. The latter must be watched and pulled out before they get too big, as they take too much goodness from the soil, but when they are young and small they look very pretty. It is cheaper and better to buy old bricks, as they are a prettier colour; they can be got from Chinese contractors when they are pulling down some old building.

Roses do very well in these tubs, and by placing some heavy clay soil on top of the crocks and then filling up the tub with a rich mixture of good soil and old manure, and adding a top mulch of manure and leaf-mould from time to time, very good results can be obtained. Roses like clay soil packed round their roots, but they also like good drainage, so that this is an ideal method for them.

Verbena tenera makes a beautiful purple mass in a few weeks if four or five cuttings are planted in a tub with a generous amount of sand mixed in with top soil. This will make a very lasting show of colour and only needs to be cut back when it is getting shabby. Fresh plants can be made from cuttings by sticking them closely and firmly into a pot of very sandy soil.

A tub placed each side of the porch, with a *Galphimia glauca* in each, makes a pleasant change from the eternal palms and ferns, and a cheerful show of yellow bloom, and is perpetual if the seeds are cut off to encourage the little bush to flower.

Balsams make a fine show of colour planted in this way, and there is no end to the variety and mixture of colour that can be obtained with say six tubs along the edge of the drive, alternately planted with Verbena and balsams, or Verbena and Zinnias; imagine what a show of colour. Zinnias do very well in these tubs, as such a small quantity of soil is easily sterilised, and it is I think from some microbe in the soil that Zinnias get "curly leaf" when planted in the ground. The Zinnia plants are started off in burnt earth, with no other ingredients; as soon as the seedlings are established they should be sprayed with tuba solution once or twice a week, and fed with *ma foo** (ground-nut cake) twice a week until colour begins to show in the buds.

Large or small quantities of burnt earth, with which the Chinese flower gardeners are so successful, are easily made in the following way. Make a mound of alternate layers of grass cuttings, lallang or grass sods with the ordinary garden soil, leaving plenty of the lallang poking out between the layers; this is easily lighted, and will soon burn its way into the centre. The mound will go on burning for about two days, and if a piece of tin is placed on the top, even heavy rain will not put it out, provided the operation was started with fairly dry ingredients. When the mound is cool it can be opened, and the burnt soil found inside will be invaluable for pot plants for the brick tubs and beds.

Endless varieties of plants will do well in brick beds, and as the bricks are not cemented experiments are easily carried out, as to the position in which the plants do best, without having scarred the lawn or garden with dug flower beds, which take some time to fill in satisfactorily. A larger bed put in a suitable place is invaluable for growing good lettuce, and a light attap roof can be rigged up over it to protect the plants from heavy rain.

Ipomoea and other creepers.

There are many kinds of these lovely flowers, the most familiar being "morning glory" and "moon-flower," and the yellow and mauve varieties of Asystasia which grow wild along the roadsides. I have lately been experimenting with newer kinds of Ipomoea from California and Australia, and find they are easy to grow; also that they make charming pot plants to bring into the house in the morning. A small trellis work is easily made with a few stout posts and wires criss-crossed between; tennis court netting is also a suitable medium for showing off these beautiful convolvulus flowers. Six or eight kinds interspersed with that delightful true blue Jacquemontia, make the early morning visit to the garden a real pleasure. If this trellis can be arranged on the east side of the house, where only the morning sun strikes, these flowers will stay out much longer. I have planted some of each variety in pots, with a bamboo inverted bell for them to climb over; these pots I bring into the house in the morning, and in the coolness and shade the flowers do not close until 4 o'clock in the afternoon. Of the newer varieties from California, I think the most beauti-

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*** In Singapore, this is obtainable in Chinese oil shops in New Bridge Road.**

ful are Ipomoea Mikado and I. Japanese. The former is a fine rich purple blue, and the latter a clear magenta with a faint white rim. Together they make a splendid show of colour, and in a small pot I have had as many as 9 blooms out on one morning, and with 8 or 10 pots of different varieties going at once there are always two or three in bloom for the house or verandah.

The ordinary blue morning glory, being a perennial, needs a permanent place to grow to best advantage, and if given a good soil, and a mulching of well decayed manure and leaf mould when it is cut back periodically, one is rewarded by a beautiful show of flowers each morning. If it is planted in a pot, and given a "ladder" of bamboo against a pillar or side of a downstairs verandah, the pot must be a big one, preferably a cheap kind of Shanghai jar. These may be got for about 50 cents each, and with six of them, planted with three different kinds of creepers, there can always be two to decorate each side of the front door of the small house. I suggest two of Jacquemontia, two of Pergularia (bunga Tonkin, for its sweet scent), and two of *Ipomoea Horsfalliae*. These three are all woody perennials, and need cutting back occasionally after they have bloomed, but as they all bloom freely and stay in flower for some time, rotation can be arranged.

Moon-flower is particularly beautiful grown in a pot, and the plant trained to cover the bamboo framework as much as possible. The flowers will begin to open at about 6 o'clock, and a pot of these, for those who like the scent, will perfume the room as well as being very beautiful, and it is interesting to watch the flowers open. When taking seeds from plants which have finished blooming, it is essential to plant them straight away, as they will not keep for long, but if planted fresh they germinate quickly and freely.

Colour in the garden.

It has often been said that it is very difficult to achieve colour in Malayan gardens, and this idea arrives chiefly from the fact that people do not trouble to substitute colourful shrubs and trees for the dense greenery (palms and fruit trees) which are found in most gardens on arrival. With very little trouble and expense, palms, old fruit trees and non-flowering bushes can be removed, and some of the many quick-growing flowering shrubs and medium sized trees put in their places.

One of the most lovely bright little gardens I have seen out here relied on only a few plants for colour, but achieved a most pleasing and home-like result. A crazy path was made with old bricks and tiles in the form of an X, and a border bed made each side of the path. At each terminal were placed a pair of small Chinese junipers, and the only change I would have suggested was that these too might have been flowering plants, either standard Bougainvilleas, Brunfelsia, *Thunbergia erecta*, or standard Hibiscus. In these beds, which were again edged with bricks (also a relief to the green grass and larger trees), masses of blue Angelonia, pink Bachelor buttons, Petunias, Coreopsis, Michaelmas daisies and yellow "lupins" (a kind of Crotalaria) gave a very fair imitation of a herbaceous border.

Leading into this little formal garden at one end of the path was a small well-constructed archway covered with carefully trained Mrs. Butt Bougainvilea, which looked exactly like a crimson rambler rose. Round the outside of the tennis court netting were some oblong brick beds filled with the perennial Coreopsis, making a fine splash of yellow and at the same time relieving the severity and dullness of the necessary wire netting. A Jacaranda and a *Cassia nodosa* and a Mimosa tree have been carefully planted and their positions well chosen.

This garden when I saw it was only five months old, and was a blaze of colour and very delightful. The trees are growing fast and well, as they are occasionally fed and their roots kept aerated by a saucer or bed round them kept weeded and forked, and yet more colour will be added when they begin to flower; the Jacaranda with its beautiful parma violet bloom, which will make a carpet of fallen blossoms on the grass, the *Cassia nodosa* with its masses of pink flowers, and the little Mimosa with its charming grey-green leaves and silver trunk and its numbers of sweet-scented yellow balls of flowers.

This garden has been made on quite new ground, but there are many small old gardens which could be made even more lovely than they are by cutting out old and ugly bushes, trees and palms, and planting a few of the many lovely shrubs and trees which flower. I can think of many such gardens where nothing new has been planted for many years except what the kebun has untastefully added—another Croton or palm, or perhaps if he is very keen a large erection covered with Honolulu creeper, which is never cut back as it should be, and has consequently become an untidy mass of dead leaves and stalks, and has long been an ideal breeding place for the ubiquitous mosquito!

No garden in Malaya is complete, to my mind, without at least two Petrea plants, two of Congea and two of Mrs. Butt Bougainvillea. The smallest garden can have at least one of each, and all large gardens could be improved by the addition of several Petreas and Congeas, and at least one of each of the many Bougainvilleas. With these three plants alone there should be always a splash of colour in some part of the garden.

ORNAMENTAL TREES OF MALAYA

BY

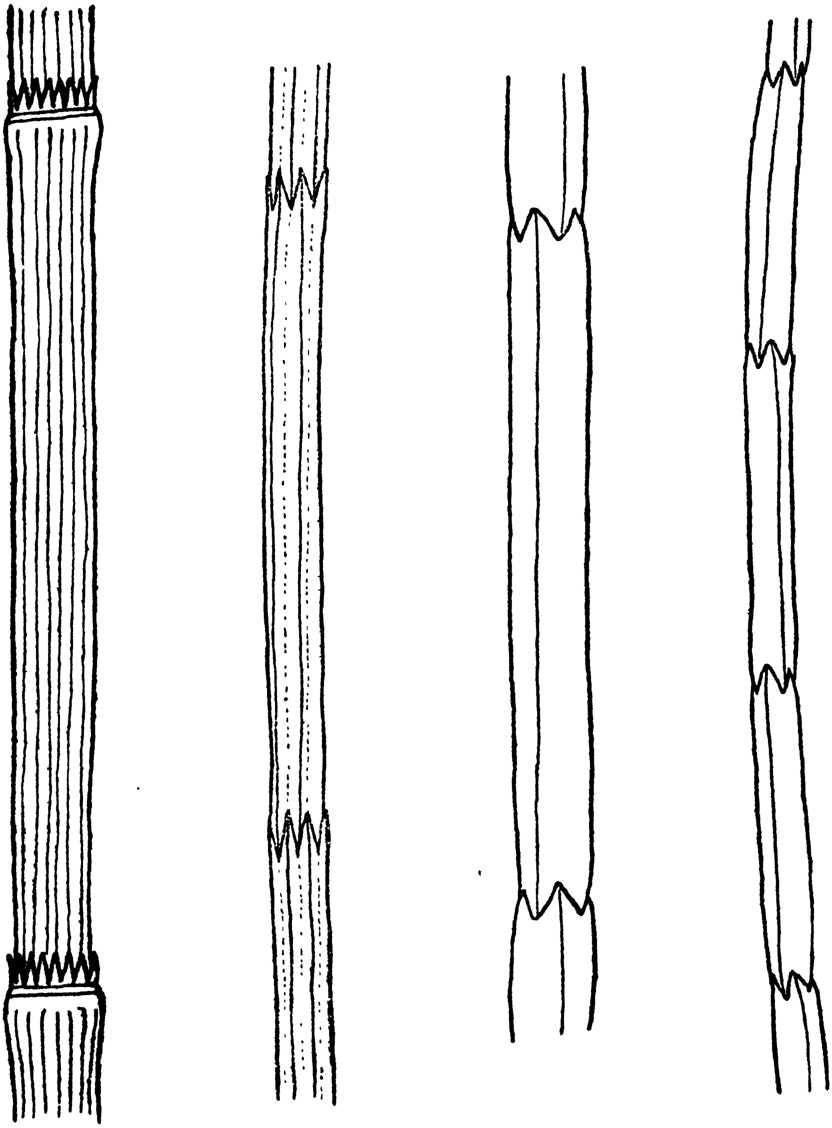
R. E. HOLTTUM, M.A., F.L.S.
Director of Gardens, S.S.

1. The Casuarinas.

The common Casuarina tree is well known to everyone in Malaya. Its local Malay name is Ru; in Netherlands India it is more commonly called Tjemara. Its botanical name is *Casuarina equisetifolia,* and it is so called on account of the resemblance of its leaves to those of the genus Equisetum (the horsetails, which are small plants of a very ancient group, not occurring in Malaya). *C. equisetifolia* is the most widely spread species of a family most of whose members (about 40 in all) occur in the Australasian region. It is found wild in south-eastern Asia, Australia and Polynesia; it has also been planted in many other parts of the world.

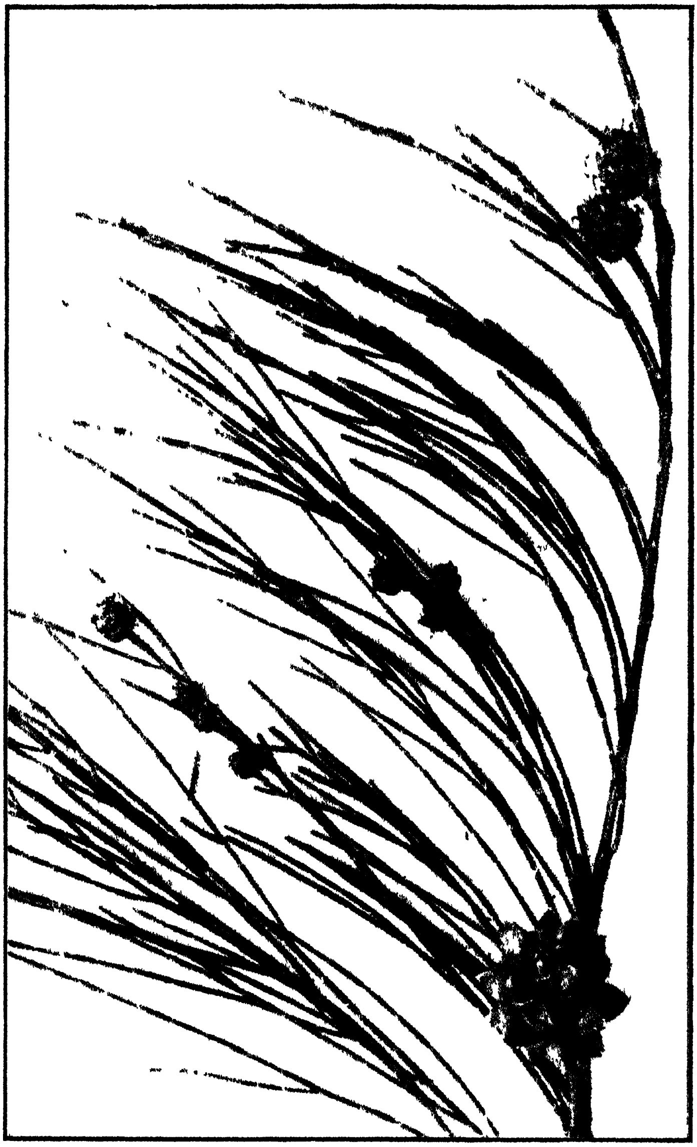
Casuarinas are at once distinguished from other kinds of trees by their very slender green twigs which are minutely grooved and jointed; at the joints are circles (whorls) of tiny pale-coloured teeth, which are the true leaves of the tree. These leaves are so small that they can hardly be distinguished without magnification. As functional leaves they are useless, and the work usually performed by leaves is undertaken by the green twigs. The twigs are so slender that they have very much the appearance of pine needles, and Casuarinas are very like conifers in habit. But they are true flowering plants, though their flowers are so small and un-flower-like that most people never notice them. The flowers of all the species are similar, differing only in small details. Male and female flowers are separate. The male flowers are borne in groups at successive joints of some of the slender twigs, being protected when young by the sheath formed by the whorl of leaves at the joint. Each flower consists of a single stamen (the structure of which is essentially similar to the stamens of most flowering plants) surrounded by minute floral parts. The stamens and the protecting sheaths are brown, and give the ends of the twigs a rusty appearance. With a hand lens the individual stamens are easily seen. The female flowers are at the ends of short branches. The flowers are crowded together and protected by overlapping bracts, from between which the long stigmas protrude; these bracts have the appearance of a miniature fir cone. The ripe "cone" is brown and woody, about ½ inch long, or rather more. The bracts open and liberate the seed-like fruits, which are flattened, with thin wing-like projections at each side, and are blown away by the wind long before the cones fall to the ground. These winged fruits are very like the winged seeds of many conifers.

The roots of Casuarina trees bear irregular swellings of a similar nature to the well-known root-nodules on Leguminous plants. It has lately



Left to right: small portions of branchlets of Casuarina glauca, C. equisetifolia, C. sumatrana and C. Rumphiana, about 12 times natural size.

Young trees of Casuarina equisetifolia (left) and C. sumatrana (right) to show different habit of growth.



Casuarina Rumphiana: small twigs with one full-grown "cone" (right hand bottom corner) and several others at different stages of development. About 1½ times natural size.

been shown, by experiment at the Imperial Forestry Institute, Oxford, that the Casuarina root nodules have the power of fixing atmospheric nitrogen in exactly the same way as those of Leguminous plants. This is doubtless the reason why Casuarina trees are able to grow so rapidly in apparently infertile sandy soil. They are not dependent on decaying organic matter in the soil for their nitrogen, as are most plants, and they do not need manuring with nitrogenous fertilisers.

Key to the species found in Malaya.

Branchlets slender 4-angled	
Branchlets in bushy more or less erect groups	C. sumatrana
Branchlets drooping	C. rumphiana
Branchlets with 6-9 teeth at each joint, tall tree	C. equisetifolia
Branchlets with 15 or more teeth at each joint, small straggly tree.	C. glauca

Casuarina equisetifolia; Ru (Malay).

Natural Distribution: South-eastern Asia, Australia and Polynesia.

A tall tree of very characteristic habit; the branches ascending and tapering to their slender points, are clothed with the curious fine green pendulous branchlets, which sway and rustle with the breeze. The length and number of the green branchlets, and the extent to which they hang down below the branches, is very variable, and it is possible that distinct varieties, with different degrees of bushiness, exist. The trunk is covered with brown fissured coarsely fibrous bark. The green twigs are very slender and little branched. They are jointed at intervals of ¼ to ⅓ inch, and at the joints are whorls of 6 to 9 teeth (leaves). The teeth are about 1/50 inch long. The twigs are finely grooved; between the grooves are ridges, each of which terminates in one of the tooth-like leaves.

The natural habit of this species is sandy sea shores. On the east coast of the Peninsula such sandy shores are found over long distances, and they are lined with groves of Casuarina trees. Under favourable conditions the trees grow very rapidly (10 feet or more in a year). Inland they will grow well if planted in a light or well drained soil. In a hard or heavy soil they sometimes make little growth. The trees are very graceful, and are very effective for ornamental purposes, but they do not give much shade. Young plants may be clipped and trimmed to rounded or other artificial shapes for formal gardening.

The timber is hard and heavy. Its chief use is as firewood, for which purpose it is excellent.

Propagation is easily effected from seeds. The cones must be picked just before they are ready to open; they are then spread out to dry. When dry they will open, and the seeds may be shaken out. The plants may also be propagated by marcotting. It appears that cuttings do not root easily, but possibly the right conditions have still to be found.

Casuarina sumatrana.
Natural Distribution: Burma, Sumatra to Philippines; not in the Malay Peninsula.

This beautiful species makes much more symmetrical trees than *C. equisetifolia*. The branches curve upwards, and bear dense bushy masses of twigs at their ends. A vigorous young tree presents a compact pyramidal mass of foliage; in older trees the branch-endings separate, but the formal shape remains. The ultimate twigs are about 6 inches long, and are four-angled, there being four teeth only at each joint. The dense bushy masses of twigs, which are not pendulous, and the formal shape of the tree, at once distinguish this species from the others here described.

Trees of this species grow well even in the poor quartzite soil of the Singapore Botanic Gardens. They are very decorative and should be more widely planted. Propagation is from seeds, which are freely produced and easily germinate. The early growth of seedlings is very slow under ordinary conditions of pot culture, and possibly a special treatment is needed for their best development.

Casuarina Rumphiana.
Natural Distribution: Moluccas, Celebes, Philippines, in mountain forests.

This species has only been introduced into Malaya in recent years. Young trees are broadly pyramidal in shape and have dense much-branched masses of twigs, the ultimate branchlets being very slender, much branched, and drooping, thus contrasting with *C. sumatrana*. The twigs are four-angled, as in *C. sumatrana*, but are much shorter and only about half as thick. Two trees in Singapore bore flowers and fruits at the age of about 6 years. These trees have attained a height of about 20 feet in 8 years. They are not so robust in growth as *C. sumatrana*. This species should be planted at our hill stations, where it should produce very beautiful trees.

The species is named after the 17th century Dutch botanist G. E. Rumphius.

Casuarina glauca.

This species is a native of Queensland which was introduced into the Singapore Botanic Gardens some years ago and has been planted at Katong and perhaps elsewhere. It forms only small trees here, and does not usually bear fruit. Its twigs are 15 inches or more long and are much stouter than those of the other species. There are 15 or more teeth at each joint. The branching is very diffuse, and the tree is not particularly ornamental. It produces a large number of root suckers, which make it a nuisance in a garden. Where a screen of smallish trees is required in a sandy place, this species might be worth planting. It is easily propagated by root suckers.

Two other Australian species of Casuarina (*C. montana* and *C. quadrivalvis*) have recently been planted at Singapore. Both are very diffuse in branching and it appears unlikely that they will make useful ornamental trees. It is probable that, like most Australian trees, they do not show their best growth and development in our uniform and moist climate.

CUT FLOWERS AND FLORAL DESIGN.

BY

C. V. VAN DORT, F.R.H.S.

At horticultural exhibitions the most popular classes, both to exhibitors and spectators alike, are those devoted to cut flowers and floral design which latter includes table decoration and baskets.

The flowers used in the making up of the floral designs need not be grown by the exhibitor but in the cut flower classes it is stipulated that the flowers are culled from plants grown by the exhibitor.

In this article it is proposed to give a brief account of the methods generally adopted in preparing, cutting, packing and staging exhibits in these two groups.

Preparation.

The grower of flowering plants who intends exhibiting his blooms in the cut flower classes does not have to bother about symmetrical growth or the appearance of his plants. In fact everything is sacrificed to obtain one or two perfect blooms on each plant. Two weeks before the show the pinching off of buds and flowers which have bloomed too early should be stopped or one may not have anything to exhibit. With the colouring of the buds many new varieties of insect pests start paying their unwelcome attentions and a visit ot inspection at night becomes necessary. What causes the greatest anxiety to the exhibitor during the period just prior to the show is the "weather." A single shower of rain is sufficient to ruin plants and as nothing should be left to chance some sort of protection must be afforded.

One method practised is to have two posts about six feet in length planted firmly in the ground at either end of the stands on which the plants are placed. From post to post at the top, a cross-bar is fixed; a sheet of corrugated iron is then bent lengthways in two and placed over the cross-bar like the ridge of a roof. At night the sheets are placed in position and removed every morning as the plants require all the sunlight they can get. At the first signs of rain they are placed in position again. The protection afforded is sufficient to break the force ot the rain though not adequate against the heavy showers we experience in Malaya.

Cutting.

As a general rule flowers should be cut very early in the morning when the stems are turgid. Use a sharp knife in preference to secateurs or clippers. The sharper the cut the less the conducting vessels are bruised and the greater the absorption of water. In addition, the absence of ragged edges lessens the chance of bacterial action. Always make a slanting cut to prevent the stems resting squarely on the bottom of the container. The cut flowers should immediately be placed in water. Cut the stems longer than required to permit of a further trimming when staging at the show.

Macmillan states that the flowers last longer if, when being finally trimmed, the stalks are cut under water and not in the air.

Thin petaled flowers should not be submerged in water on being cut, but many thick petaled flowers may be with advantage. Hydrangias in particular should be entirely covered with water and kept submerged for half an hour before being placed in their container.

Selection.

Care should be taken in selecting the blooms intended for exhibition. Keeping in mind the length of time which must elapse before the blooms are viewed by the judges, those which are not fully open should be selected. Some flowers like lilies and tuberoses are best cut as buds the morning previous and kept in water in a cool dark place to open. It is a good plan to cut a few more blooms than are required and take them to the show in case of accidents.

Packing.

Many keen horticulturists in Malaya who reside a distance away from the town at which an exhibition is to be held are under the impression that it would be impossible for them to get their flowers to the show in a fresh condition. If one considers that flowers grown on the hills of Java take 48 hours by rail and steamer to reach Kuala Lumpur and yet arrive sufficiently fresh to be saleable, it should be apparent that a journey of 8 or 12 hours anywhere in Malaya should not act as a deterrent.

If the flowers have to travel any great distance, immediately on cutting them, plunge the stems deep in water up to the base of the flower and let them soak for at least an hour before packing.

Select a flat basket of woven bamboo or cane which will give the maximum amount of ventilation. Line the basket with wax paper and pack the flowers flat, each layer being held in position by a batten to prevent their being shaken about and bruised in transit. On arrival at their destination their stems should be cut and any damaged foliage removed and the stems again plunged in water. No water should be sprinkled in the basket. Tissue paper which is likely to absorb moisture should not be used. As the time taken to revive varies with different varieties of flowers it would be advisable for them to reach the show the evening previous so that they may have the whole night in which to revive. Very delicate flowers can be packed upright in tins containing water but a little moss should be placed in the mouth of the tin to prevent the water being jolted out. A round basket, at least six inches taller than the tops of the flowers when placed in the tin, is required. The sides should be lined with paper and a nest of moss or grass placed at bottom of the basket and the tin embedded in it, to prevent its upsetting. For additional security two sticks can be passed through the basket on either side of the tin and the tin tied to the sticks. The top of the basket is then covered over with sacking, cloth or paper and securely tied.

Flowers like Zinnias, Asters, Chrysanthemums, Orchids, Lilies, Indian Pinks, Dahlias and even Roses, can be packed dry and travel well. Do not discard any flowers that look wilted on arrival as a night's soaking works wonders. Dahlias in particular often look quite wilted but revive in water after a few hours.

Staging.

The impression an exhibit makes on the judges is largely dependent on the way in which it is arranged and presented for inspection. Flowers which naturally grow in clusters like Phlox should be staged in bunches, while large flowers, like Dahlias, are best staged singly. If the space allotted an exhibitor has no background, such as a sidewall of attaps covered with greens, no objection is usually raised to the exhibitor's draping the back of the stand with green or black cloth or crepe paper to provide a background for his exhibit. The stand itself should be covered with moss or paper or cloth. Plain glass tube shaped vases or tins painted a neutral green or black should be obtained in which to arrange the flowers. The most convenient sizes will be found to be 6 inches and 9 inches in height. Some exhibitors prefer using exhibition boxes. These are made of light wood on the principle of a writing desk. The lid is perforated with holes spaced according to the size of flower it is intended to exhibit. Inside the box, to correspond to the perforations on the lid, tins are placed containing water. Exhibition stands made of heavy sheet tin, on the same principle, are obtainable from most horticultural sundriesmen.

Arranging the Flowers.

When vases or tins are used, it will be found necessary to have something in the container to help to support the stems and to enable the exhibitor to place the flowers exactly where wanted. A few stems of the stagfern moss submerged in the water will answer the purpose. The moss should not show above the rim of the vase, as cut flowers should only be staged with their own foliage. In placing the vases give them sufficient space; each vase of flowers should stand clear of the next. Generally the vases with the largest blooms are placed in the back row and the rest in front. In arranging, avoid strong contrasts of colour; it is well to remember that white is an invaluable colour for separating colours that would otherwise clash.

Floral Design.

Of all floral design classes, that of table decoration is the one that attracts the largest number of competitors. In table decorations the first point to be observed is that the decorations suit the occasion for which they are intended. In the M.A.H.A. schedule it is stated to be for the centre of a dinner table, and for a dinner table, whether the dinner be formal or informal, the decorations should be more elaborate than for a luncheon or tiffin table. Under no circumstances should the decorations obscure the vision of the persons seated at the table. No hard and fast rules can be laid down for arrangement, as the award largely depends on the personal fancy of the judges, but lightness of design and originality in arrangement should be aimed at. A point seldom taken into consideration by the judges, though important to anyone decorating a dinner table in reality, is the appearance of the colours of the flowers by artificial light. Blue for example under artificial light becomes less intense and should be avoided for evening decorations. Yellow too, becomes less intense but this is an advantage as its harshness is toned down and subdued. Pink, white and red are suitable for artificial light effects.

If the majority of judges are men, the colour scheme should be of pronounced colours, such a deep rose, red, orange or white; if ladies are to judge, stick to the lighter hues like pink, yellow and orchid.

Baskets.

In colour, the basket itself should be inconspicuous. Long baskets and square baskets with high handles, lend themselves well to proper arrangement and permit of a number of different kinds of flowers being used. The basket should always be selected to conform to the length of the flower it is intended to use, therefore tall baskets should only be used for long stemmed flowers. In arranging the flowers avoid overcrowding; looseness of arrangement, so that each individual flower can be seen, has superseded the mass effect of a few years ago.

Other Floral Designs.

These designs are more within the province of the professional florists than the amateur exhibitor. A frame work of cane or wire is made to the shape of the design it is intended to make up. This is then mossed over, care being taken that in the mossing, the shape is not lost. Flowers and greens are then wired on. The flowers should be wired to stand out from the foliage and present as natural an appearance as possible.

HINTS ON THE USE OF FERTILISERS

BY

A. R. WESTROP, N.D.A., P.A.S.I.

No. 3 Vegetables.

As vegetable growing is one of the most intensive forms of agriculture, several crops being raised from the same soil in one season, success can only be obtained by the use of fertilisers on a scale which would be far in excess of normal farming or estate practice. Indeed it has been estimated that the Chinese market gardeners of the Kuala Lumpur Sanitary Board area, where the keeping of pigs and the use of night-soil is forbidden, may, in the cultivation of the Chinese cabbages of which they raise about 10 crops in the year, employ from ten to fifteen tons per acre annum of a manure such as Prawn Refuse. Actually the proportion of plant foods supplied by the latter fertiliser is not particularly well suited to the needs of that crop and they are gradually learning that much smaller quantitites of a well balanced artificial fertiliser containing organic matter, will give superior results at a lower cost.

Requirements of Vegetables. Bearing in mind the chief effects of the three essential plant foods, i.e.,

Nitrogen for growth and leaf production,
Phos. Acid for flowers, seeds or fruit,
Potash for sugar and starch formation,

it is possible roughly to classify vegetables according to their dominant plant food requirement, viz :—

(1) Vegetables grown for leaves :—Lettuce, Spinach, Cabbage.
(2) Those grown for their seeds or fruit :—Tomato, Brinjals, Ladies Finger.
(3) Those grown for tubers or bulbs :—Potatoes, Artichokes and Onions.
(4) Leguminous crops :—Beans and Peas.

and to supply fertilisers accordingly.

In practice however it is essential to remember that complete fertilisers (i.e. those containing the three essential plant foods) should usually be employed, for no vegetables can make use of a maximum quantity of any one plant food unless a certain minimum of the other two are present. An exception to this rule is found in the case of leguminous crops which have the property of obtaining their own supplies of nitrogen (by co-operation with bacteria) from the air and so chiefly require phosphate and potash. Unless the soil contains an ample supply of organic matter, it is also essential to employ mixtures containing organic manures, such as blood, oil cakes bone meal etc : to ensure the maximum effect from any chemical fertilisers employed.

Notes on Fertilisers :—

Fertilisers are often divided into two groups viz :—

(a) Natural

(b) " Artificial "

the former including cattle or pig or goat manure, poultry droppings, fish refuse, bats' guano and other locally produced manures, the latter term including the balance. As under the term " Artificial " are included such organic fertilisers as blood and bone meals, sterameal, whale and fish guanos, groundnut and other oil cakes, it will be seen that it is difficult to draw a hard and fast distinction between the two classes.

Cattle Manure is a valuable source or organic matter and, when well made and preserved, a very useful source of plant food. It is very bulky however and unless supplemented by " artificials," heavy dressings are required, 10 tons per acre being a minimum application. Owing to limited supplies available in Malaya cost of transport is often much in excess of the value of the manure. An alternate source of similar organic matter is the synthetic farmyard manure which can be made by the ADCO process from most forms of organic waste, grass cuttings, prunings, leaves, lallang etc : but again the raw material is often lacking in the substantial quantities required for market gardening.

Poultry droppings form a valuable fertiliser which being much more concentrated than cattle manure requires a little care in use.

Bats' Guano which is obtainable at a low cost in some parts of the peninsula is a useful phosphatic fertiliser but to secure the best results it should be used with fertilisers supplying nitrogen and potash. Unfortunately Bats' Guano varies enormously in the percentage of plant food it contains, some samples being as low as 5% phosphoric acid and others running up to 18 or 20%.

"Artificial" Fertilisers. Space does not permit of a detailed considertion of the many chemical and organic fertilisers supplying various plant foods which may be used in manuring vegetables. Of those supplying nitrogen, sulphate of ammonia, nitrate of soda and calcium cyanamide are most important amongst the chemical and blood meal and oil cakes amongst the organic. Sulphate of ammonia is an excellent main source of chemical nitrogen, being cheap, and is well retained by average soils. Its continued tends to increase acidity and on very acid soils basic forms of nitrogen are preferable. Nitrate of soda whilst considerably more expensive has a great reputation amongst market gardeners owing to the extreme rapidity with which it acts, as it can be taken up direct by the plant without nitrification. It is thus particularly favoured as a top dressing and most fertiliser mixtures for vegetables should contain at least a small proportion.

Calcium cyanamide is a basic form of nitrogen, half its weight being lime in a very fine state of division. This fertiliser is most effective on acid soils but requires some care in application and should not be applied as a top dressing. The organic fertiliser Blood Meal is the most rapid in action and considerable quantities are used in european horticultural practice for such crops as tomatoes.

The standard forms of chemical phosphoric acid are superphosphate and basic slag, the former which is soluble in water being generally recommended in books on gardening. On some types of soils in this country however an acid form of phosphoric acid does not give satisfactory results and the finely steamed Bone Flour which in the tropics is not much slower in action should be substituted in mixtures where the presence of ammonium compounds does not permit of the use of basic slag.

Potash may be supplied in the form of muriate or sulphate, the latter being a more expensive form but, owing to its freedom from deliquescence the more preferable one for use in Malaya.

In addition to the above single fertilisers a number supplying both nitrogen and phosphoric acid, such as Nicifos and Whale Guano, or nitrogen and potash, e.g. nitrate of potash, can be obtained.

There are also now available the complete chemical fertilisers e.g, Supram, Enpekay, and Nitrophoska containing the three plant foods in various proportions. These are very concentrated but are useful tonics if applied in solution. Sterameal, a complete organic fertiliser derived from the carcases of animals, has also given excellent results in the general enrichment of the soil and in the manuring of the more permanent crops.

Space does not permit of detailed recommendations for the different vegetables and it will be seen from the above that consideration must in any case be given to the soil conditions. Mixtures designed to give both rapid and continuous results can however be now obtained to any specification from fertiliser manufacturers in Malaya for any crop.

Amounts and Method of Application. A suitable dressing of a complete organic mixture for use when preparing beds is 4 ozs. per square yard per crop and this should be well worked into the top soil preferably a few days before sowing the seed or transplanting seedlings.

For tomatoes, which are usually grown in tins or tubs, use 1 lb. of fertiliser per bushel of soil and give two top dressings of 1 oz. per plant during growth. Watering with a solution of a chemical fertiliser such as Supram or Enpekay when the fruit first set is very helpful.

For beans, cucumbers, brinjals and ladies' fingers, put 1 teaspoonful of fertiliser into each hole, a few days before planting. Top dressings of fertiliser in solution may be given once weekly for a month following planting.

For cabbages and lettuces, in addition to a full dressing in the beds, a "pinch" of a complete organic mixture weekly gives very successful results.

"Little and often" should be the motto in all manuring with artificial fertilisers.

GARDEN PLANNING IN MALAYA (*continued*)

BY

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Article II dealt with "The Front and Back Strip Garden" as a section of "The Small Plot". In preparing this article it has been found more practical to combine "The Half Acre Garden" and "The Small Garden", for, with a slight adjustment of measurements, plans for the former are applicable to the latter and *vice versa.* Therefore, the type of garden now dealt with is the garden of half an acre to one acre, or "The Small Garden".

The Small Garden.

In considering this type of garden it would be advisable to consider what half an acre of land looks like when measured up. Without entering into precise figures it is sufficient to visualise, or better still to mark out, a piece of ground about 49 yards square. Such a piece of land would be slightly less than half an acre. Similarly, in an ascending scale, three quarters of an acre of land would be roughly 60 yards square and one acre would be 69½ yards square.

For the purposes of this article garden areas of 50×50 yards in the one case and 60×40 yards in the other have been chosen as being more easy to deal with in the preparation of diagrams to scale. These areas are exclusive of the houses and extend up to the points indicated on the figures, so that the actual garden areas are in each case over half an acre.

This type of garden is commonly met with and the following points should be mentioned in connection with it:—

1. In the order type of house or bungalow a much better sense of proportion seems to have been maintained between house and garden. No doubt, this is due to the fact that land was cheaper in the days when these houses were built and proportionate gardens could be allotted to them. The more modern houses are often sadly wanting in this respect and there is generally a distinct lack of proportion between house and garden. This is to be deplored, but is to be expected in view of the increased value of land, particularly in town areas.

2. Houses possessing gardens of this size are usually provided with one entrance and therefore with one drive. Usually there is a garage which necessitates the provision of a road from the front door to the garage. The position of the drive is therefore an important factor in deciding the lay-out to be adopted for the garden. The entrance may be either centrally placed or be situated near to one end of the front boundary of the land. The drive will in the former case cut the garden area into two halves and in the latter will be situated near to one of the lateral boundaries and run more or less parallel to it. The important bearing which this has upon the lay-out will be readily seen when the plans for these two types of garden are considered.

3. The shape of the land is usually variable. The older type of house is liable to have irregular boundaries and is almost certain to have a more generous road frontage. Irregular boundaries are a great advantage in planning the garden, as the artificial construction of irregular lines by planting is less essential and an informal plan is more easily developed. Generous road frontage usually means a centrally positioned entrance and a centrally placed drive. The more modern houses are usually built on a rectangular piece of land which may be square or oblong, more usually the latter, as road frontage is too valuable to devote very much to a house of this type. Plans have been prepared, therefore, to suggest lay-oùts for either square or oblong gardens. These are applicable in a modified form to the garden with irregular boundaries, in fact, if the underlying principles are put into action in this type of garden the result should be more attractive.

4. The question of aspect should be considered. It is seldom thought of in these days from a house point of view. In fact, it would be difficult to consider it for this type of house, which must of necessity face the main road and therefore may have any aspect. Since this is so, whenever possible the garage should be situated on the "hot" side of the house and the rooms most used be situated on the "cool" side of the house and away from the garage road. With a view to emphasising this point the plans (Figs. III and IV) have been prepared with a north aspect. This has a definite influence on the position of the drive in one case (Fig. IV) and in the position of the garage road in both cases (Figs. III and IV).

With the above preliminary remarks it is hoped that detailed explanations of Figs. III and IV will serve to bring out the main features in the planning of gardens of this area.*

Figure III.

This is a plan for dealing with the square type of garden. The limits of the half acre are indicated. It has a centrally placed entrance and drive and a generous road frontage. The proportion between size of house and garden is well balanced and it has a north aspect, which is almost ideal for this country. It will be seen that the garage has been placed on the west or "hot" side of the house. The main drive has been planned to diverge in a symmetrical manner and to join up with the garage road in such a way as to allow of easy passage to the garage. The advantages of this road system are obvious and while it adds to the length of the road to be maintained it is so much better than any other treatment that the extra cost is well worth while. Starting with this ground work it is not difficult to plan an attractive garden. The plan must be something formal in character and the central position of the drive emphasises the necessity for a symmetrical lay-out.

*** Fig. IV and its discussion will be published in the next issue of this magazine.**

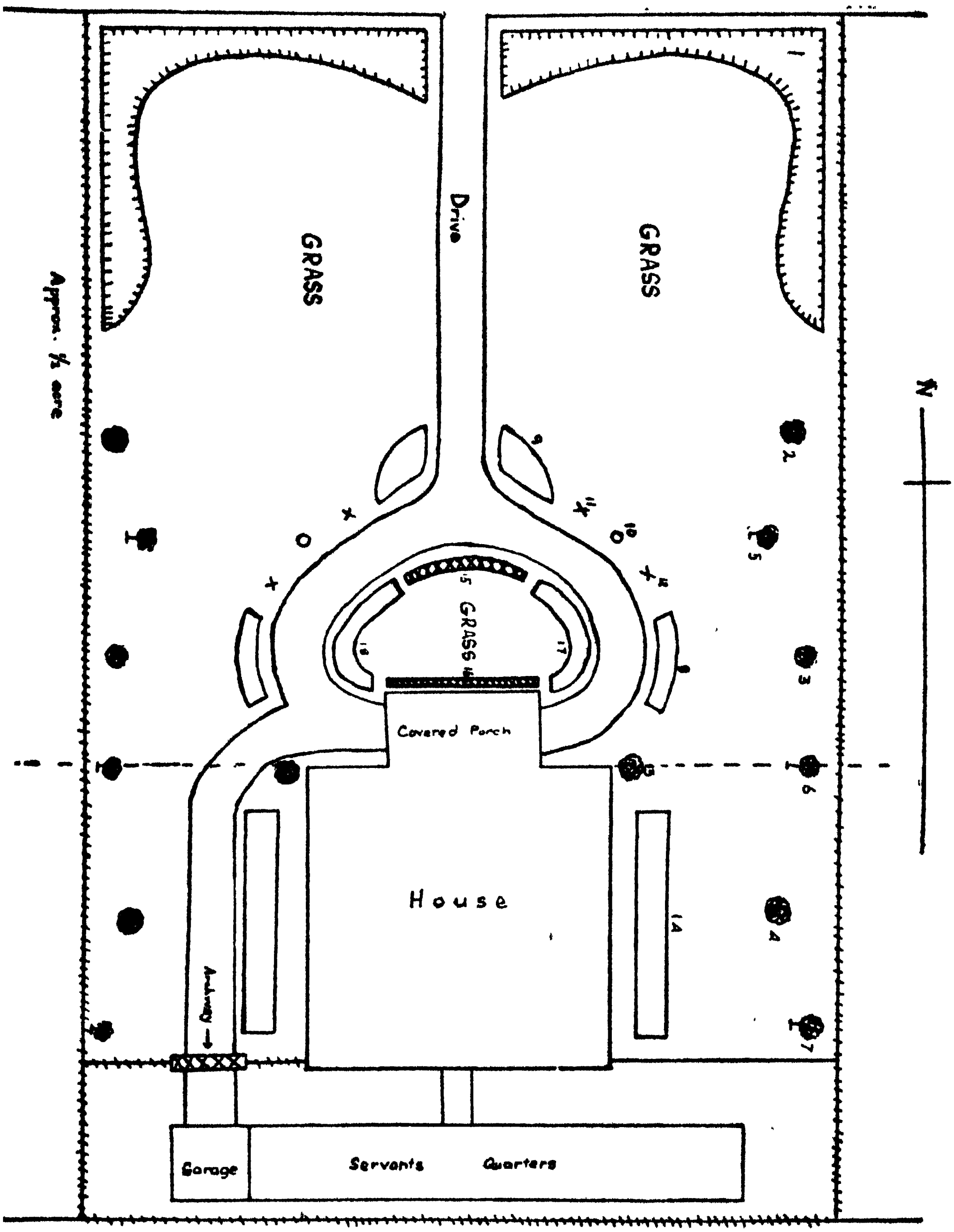
GRASS
Drive
GRASS
Approx. ½ acre
N
1
2
3
4
5
6
7
8
9
10
11
12
14
15
16
17
18
GRASS
Covered Porch
House
Archway
Garage
Servants Quarters
0
10
20
Scale in yards

Figure III

To describe the plan it will be necessary to deal with it in sections. These are as follows :—

Sections.

BOUNDARIES—It is presumed that these will consist of well grown hedges as it is unlikely that walls or fences will be provided. An additional hedge cuts off the back part of the area at the back line of the house.

EASTERN SECTION—This consists of the area on the east side which is bounded by the drive, front and side boundary hedges, part of additional hedge and the east wall of the house.

WESTERN SECTION—Comprises the area on the west side with similar boundaries.

OVAL SECTION—This comprises the small grass area immediately in front of the house and bounded by the forked part of the drive.

Explanation of Lay-out

BOUNDARIES --It will be seen that the hedges form an unbroken line around the area save at the entrance. This secures complete privacy and in view of this emphasis is laid on keeping the boundary hedges in good condition. Similarly, the additional hedge should be well maintained as it completely shuts off the rear quarters from the garden and house.

The keynote of the hedges can be summed up in the one word "privacy."

EASTERN SECTION—Owing to the central position of the drive this section comprises almost half of the garden. Whatever plan is adopted for its lay-out must be balanced by the western section. Keeping this in mind the lay-out is as follows :—

BORDER 1.—This border is designed to give plenty of colour at a sufficient distance from the house to be appreciated and to be proportionate to the size of the garden. Its irregular front line is designed to avoid a too formal effect and also to give an idea of greater lawn area.

TREE 5.—This is a good position for an ornamental tree.

TREES 6 AND 7.—These are trees for screening purposes which with Tree 5 form an irregular row which prevents any tendency to flatness along the lateral boundary.

SHRUBS 2, 3 AND 4.—These are scandent shrubs which alternate with the trees and with them form slightly irregular side planting, both in height and laterally.

BEDS 8 AND 9.—These are two flower beds which with Shrubs 10, 11 and 12 follow the curve of the drive and emphasise the oval section.

SHRUBS 10, 11, 12.—Shrub 10 should be of the bush type; Shrubs 11, 12 should be standards.

SHRUB 13.—This is a scandent shrub to break the sharp lines of the corner of the house.

BED 14.—This long flower bed breaks the line of the house and is a useful place to grow annuals for cut flower purposes.

WESTERN SECTION—This section is a replica of the eastern section which it is meant to completely balance. The only differences which appear are the garage road and the archway spanning it where it passes through the additional hedge. It is, therefore, unnecessary to treat this section in detail.

OVAL SECTION—This small area has been set aside as a sitting out place suitable for tea purposes; if fitted up with a long-flexed standard lamp, suitable for use during the evening. The planting is as follows :—

SUPPORT 15—This is a plant support bearing a suitable climber. It serves to give complete privacy from the road.

TRELLIS 16—This is a creeper-covered trellis to block out the porch. It will also serve to protect from the late afternoon sun any shade plants such as ferns which may be grown there.

BEDS 17 AND 18—These are two long flower beds or borders following the curve of the drive which complete the design for this small section and add to the feeling of seclusion by blocking out the drive.

NOTE— The lateral boundary hedges and the screening trees adjacent to them should ensure almost complete privacy in this small area.

Plants suggested for Lay-out.

It is intended to give the names of species suitable for planting from which a selection can be made. Colour schemes cannot be dealt with in these articles as they are a special subject in themselves. The following plants are suggested for this garden plan :—

Boundaries.

These are generally dealt with when the garden limits are first defined. Usually, the hedges are neglected and whether or not good ones are produced is a matter of luck. Where there is the chance to put in completely new hedges, as in a garden attached to a new house, the matter should be given the consideration it deserves. There are several species suitable for hedge purposes and with a little thought good hedges can be produced. The following are suggested :—

HIBISCUS—*H. rosa-sinensis* should be used or any of its varieties. *H. schizopetalum* is not a satisfactory hedge plant.

BAMBOO—takes a few years to establish but amply repays the trouble.

BIXA—a very quick growing hedge but needs regular manuring.

ACALYPHA SIAMENSIS—an excellent hedge—seems to prefer tidal areas.

There are several other species suitable for hedge purposes but the above will suffice.

Eastern Section.

BORDER 1.—This is a large border and it is meant to form a prominent feature of the garden. An effective method of treating it would be to plant it up with a combination of shrubs, herbaceus plants and annuals, i.e. to produce what is commonly termed in this country an "herbaceous border." In passing, it should be pointed out that such a border is not an herbaceous border in the correct meaning of the term. The following species are suggested :—

SHRUBS—Hibiscus (various varieties) trained as standards. Ixoras, Brunfelsias, Thunbergia erecta etc. These should be used towards the back of the border.

HERBACEOUS PLANTS—Cannas—keep towards back of border. Plumbago capensis, Angelonia, Orthosiphon stamineus, Mirabilis Jalapa, Michaelmas Daisies etc. should be situated more or less in the middle of the border and be allowed to grow towards the front.

ANNUALS—Amaranthus, Balsam, Celosia, Coleus, Helianthus, Coreopsis, etc. in groups towards front of border according to size.

The above plants make a very attractive border and if the planting is carefully done considerable variation in height and in colour effects can be obtained. It is easily maintained, for all the species mentioned are easily propagated either by cuttings, division or seeds.

TREE 5—A small ornamental tree—Cassia fistula (India Laburnum) Cassia multijuga, Cassia nodosa, Brownea spp. Saraca spp. Jacaranda etc.

TREES 6, 7—Screening trees—Erythrina indica, Peltophorum ferrugineum, Nephelium lappaceum (Rambutan) Garcinia Mangostana (Mangosteen) Achras Sapota (Chiku) etc.

SHRUBS 2, 3, 4—Scandent shrubs—woody climbers or half climbers which, when planted without support, tend to form large thick bushes—such as Bougainvillaea (all varieties) Bignonia magnifica, Petrea volubilis, Mussaenda erythrophylla, etc.

BEDS 8, 9—Cannas of suitable colours might be used for these.

SHRUBS 10, 11, 12—For Shrub 10 use any bushy shrub such as Ixora, Bauhinia (bush types), Hibiscus (bush), Brunfelsia, Kopsia, etc. For Shrubs 11 and 12 use standard Hibiscus.

Shrubs 13—A scandent shrub—use species as for 2, 3, 4.

Bed 14—Cannas may be used—alternatively use annuals for cut flower purposes.

Western Section.

Plants as suggested for Eastern Section.

Archway—Use a strong climber such as Bongainvillaea (var. Mrs. Butt would be very effective), Petrea volubilis, Allamanda, Dipladenia, etc.

val Section.

This section, together with the beds near it, provides the central planting of the garden. In view of this, its proximity to the house and the purpose for which it is to be used, it should be carefully and tastefully planted up.

Support 15—Antigonum (Honolulu) Porana volubilis, Dipladenia, Clematis, etc.

Trellis 16—Antigonum, Ipomoea or any light climber.

Beds 17, 18—These require special attention. They should be planted in border fashion with groups of annuals and herbaceous plants with a few standard Hibiscus or Oleanders to avoid flatness.

(To be continued.)

MORNING FLOWERS

BY

R. E. HOLTTUM, M.A., F.L.S.
Director of Gardens, S.S.

Many people grow evening flowers, such as moonflowers and spider lilies, for their scent; the finest of them all is the magnificent Keng Wah, which opens late in the evening. Nearly all are large and white and fragrant, and open about dusk. The Java lily, though its flowers last two nights, is really one of the evening flowers, as its buds always open as the day closes, and its perfume is then strongest. Probably not so many people realise that there are many very attractive morning flowers, probably a larger variety than the evening ones. The morning flowers contrast with the evening ones in usually having bright colours, and though they usually lack in fragance, their fresh beauty in the freshness of the morning is very attractive. Most of them are over by noon, and some much earlier.

First of course come the morning glories, near relatives of the moonflower. The finest has the vivid deep blue flowers which are so well known, but there are many others. They may be divided into the short-lived and long-lived kinds. The short-lived kinds vary in length of life from a few weeks (the pretty Japanese morning glories of many colours) to several months. We have had from Mexico seeds named *Ipomoea caerulea* which gave beautiful sky blue flowers, the plants lasting somewhat longer than the Japanese kinds, but producing no seeds in Singapore. Peter Henderson's "Baby blue" has flowers of a similar colour, and also fails to seed here. Then there are the closely allied small red flowers called Quamoclit: American names for them are "Cypress vine" and "Cardinal creeper." The common one has very finely divided leaves, another has leaves with broader divisions, and a third has almost undivided broad leaves. They are all annuals, and flower for about two months before dying; they all seed freely. The long-lived morning glories are less brilliant in colour, but they keep on growing and flowering indefinitely and are most useful plants. One is *Ipomoea pulchella*, a slender climber with pale mauve flowers; the other, *I. digitata*, is a stouter plant with flowers of a deeper colour. *Ipomoea pulchella* probably gives a more uniform cover over a wire screen (such as the end of a tennis court) than any other climber. Akin to the morning glories is the beautiful Jacquemontia with its pretty little sky blue flowers. It is not so robust or large a plant as most of the Ipomoeas, but it will keep on growing and flowering almost continuously. One of the Ipomoeas (*I. carnea*) has an almost shrubby growth, with large pale pink flowers.

There are several other shrubby plants whose flowers only open in the morning. One of the best of these is *Hibiscus radiatus*, a tall prickly shrub which at first has rather the habit of a hollyhock. Its flowers are large, cream with a maroon centre, and there is a variety with deep wine red flowers.

Two kinds of Turnera (dwarf shrubs from Tropical America), with yellow flowers, are well known; one has bright yellow flowers, the other pale yellow with brown centres. A third species has recently been introduced, having smaller bright orange flowers. All Turneras are free-flowering, and are very beautiful in the morning, but in the afternoon they are not a very pleasant sight as their foliage is not particularly handsome. *Oxalis dispar*, a small bush from South America with pretty but very delicate yellow flowers, has similar flowering habits.

Two species of Ruellia (a large genus of South American plants), with more or less blue flowers, come also into this category. The smaller one (*R. tuberosa*) is more or less established as a weed or roadside plant in some places, and its rather large pale blue flowers, among its almost prostrate stems, are pretty in the morning. *Ruellia malacosperma* has a more upright growth (about 18 inches high) and narrow leaves; it has numerous pretty lavender blue flowers every morning.

Among ground orchids, *Bromheadia palustris* is a morning flower. It is a native of Malaya, and grows abundantly in rather open places in wet or heavy soil. Its beautiful pure white flowers (the lip marked with yellow and purple) are produced in quantities at intervals of a week or so, all opening together on the same morning. They are faded by noon on a hot sunny day.

Several water plants also have morning flowers. The Egyptian lotus (*Nymphaea Lotus*) and its hybrids, typical water lilies with floating leaves and flowers varying from white through shades of pink to deep red, open during the night and close before 10 in the morning. The same flowers open and close several times. The same remark applies in rather less degree to the Indian lotus (*Nelumbium*), which has leaves and flowers on tall erect stalks, not floating. These flowers last longer through the day than those of the Egyptian lotus, but they always close somewhat in the afternoon except when they are nearly over. There are other water plants which have morning flowers, most notably *Monochoria elata*, which has beautiful sky blue star-shaped flowers in a small bunch on a stem 3 feet tall. The flowers wither about 2 p.m., and a fresh group appear next morning, till all the buds in the inflorescence have expanded. This plant is found in rice fields in the north of the Peninsula.

It is pleasant to have morning flowers grouped together in one part of the garden. If they are mixed with other plants their lack of flowers causes unpleasing gaps in the afternoon, and in the morning one may miss the full effect of their beauty. They should have a place where the morning sun shines on them.

GROWTH PERIODS OF FLOWERING-PLANTS COMMONLY GROWN IN MALAYA.

A list showing the maturation-periods of local vegetables was published in the last number of this magazine. Several requests have been made for a similiar list showing growth-periods of flowering plants. Such a list may be useful for reference in at least two ways. Firstly, in order that seeds may be sown the correct length of time before flower-shows or other occasions when plants are wanted at their best. Secondly, in order that advantage may be taken of seasons when comparatively dry weather may normally be expected. Most of the commonly grown annuals succeed best during dry spells of weather in this country and it is worth while concentrating on having a good show of flowers at such periods.

The list given below has been compiled from records made in the Botanic Gardens, Singapore and in the Public Gardens, Kuala Lumpur. Some variation from the times given must of course be expected as conditions of growth may accelerate or retard flowering, while in some cases different horticultural varieties of the plants listed mature a little more quickly or slowly than the average. It is hoped however, that the times shown will be found sufficiently accurate for general guidance.

Name of plant		Number of days from sowing to germination.	Time (weeks) from sowing seed to commencement of flowering.	Duration of flowering. (weeks)
Amaranthus tricolor	...	3	5-6	8-10
Antirrhinum	...	6	10-11	4
Aster	...	5	12	4
Balsam		4-5	6	2
Begonia (fibrous rooted)	...	7	14	
Begonia (cuttings)	...	10 (rooting)	8-9	
Carnation	...	6-7	13	8
Capsicum	...	3	12	5
Chrysanthemum (cuttings)	..	10	16	3-4
Cockscomb	...	3	8	8
Coreopsis tinctoria	...	7	12	1
Coreopsis (Dwarf crimson)	...	7	10	1
Cosmos	...	2	6	2-3

Name of plant.	Number of days from sowing to germination.	Time (weeks) from sowing seed to commencement of flowering.	Duration of flowering. (weeks)
Dahlia (seeds) ...	4	10	4
Dahlia (tubers) ...	4	10	5
Dahlia (cuttings) ...	10 (rooting)	10	5
Dianthus ...	3-5	7-8	6-10
Gaillardia ...	5	10	11
Gloxinia ...	5	10	
Gladiolus (corms) ...	4-6	8	2
Helianthus ...	6	10	8
Hollyhock ...	4	13	3
Hydrangea (cuttings) .	12	28	4
Marigold (French) ...	3	10	4
Marigold (African) ...	4	10	4
Michaelmas Daisy ...	7	12-13	
Nasturtium (Tropaeolum) ..	5	8	
Petunia ...	3	10	4
Phlox Drummondii ...	7	11	4
Portulaca ...	4	7	3
Salvia ...	3	10	4
Sunflower ...	5	8	4
Torenia ...	3	7	4
Tithonia (Maxican Sunflower) ...	5	8	4
Verbena ...	3	10	8
Zinna ...	3	6	3

B.A.L.

MISCELLANEOUS NOTES

The West Indian Cherry Tree.

This very useful little tree is now well known in most parts of Malaya. It is in fact so abundant that probably most people do not realise that it is a very recent introduction into Malaya. We have no definite record of its first appearance, but it was certainly not much more than 20 years ago. The great abundance of "cherry" trees today is partly due to their rapid growth under suitable conditions, partly to their being of so suitable a size and shape as small shade trees, and partly to the distribution of their minute seed by bats. The trees are not particularly cherry-like, nor are their fruits, but the name cherry has evidently come to stay. We would suggest the addition of "West Indian" to the name, for the tree is really a native of the West Indies, and is as much an exotic as our Cattleyas. Its botanical name is *Muntingia calabura*.

Propagation notes.

We are indebted to Major-General L. C. L. Oldfield for the following:

> A year and a half ago I found trouble in getting my *Tithonia speciosa* to grow from seed, so I tried propagation by cuttings. Strong young shoots were used and the first few buds pinched off. There have been practically no failures.
>
> Later, I tried cuttings of *Achimenes longiflora*, as tubers and seeds are very slow in growth. In this also I have been successful, especially in damp weather.
>
> By looking ahead I have now both Tithonia and Achimenes continuously in flower throughout the year.

In the case of Tithonia, propagation by cuttings may be particularly useful, as seeds are often slow and irregular in germination, and it is not easy to secure a full and uniform crop of seedlings for bedding purposes. Other annuals which may be grown from cuttings are *Gynandropsis (Cleome)* and African and French marigolds. Cleome rarely fails to produce abundant seeds, but in wet seasons it is often useful to propagate the marigolds from cuttings. The question of propagating annuals in this way has received little attention, and there may be other cases where such propagation may be useful owing to uncertainty of seed production.

The blue Plumbago always seems to be a rather difficult plant to handle, and propagation by division of old plants is a rather uncertain business. We do not remember seeing definite instructions about propagation from cuttings, and perhaps it may be useful to record here that in Singapore Mr. Lennon has found that cuttings taken from the green parts of the stems grow fairly easily, but not cuttings from the old woody parts.

Flowering of Hippeastrum (Red Lilies).

Two kinds of Hippeastrum are rather commonly grown in Singapore, both apparently varieties of *Hippeastrum equestre,* the Barbados lily, a native of the West Indies. The common kind has salmon pink flowers and rather narrow leaves; it flowers rather freely, especially in sandy soil near the sea. The other kind, which is really the typical Barbados lily, has scarlet flowers and much broader leaves; it has also larger bulbs. This scarlet Hippeastrum does not flower at all freely, and plants kept permanently in a bed only produce an occasional flower.

Both kinds of Hippeastrum can be made to flower freely if the bulbs are rested periodically. After the plants have made good leaf growth for a few months the bulbs should be dug up and spread out in a dry airy place, preferably protected from direct sunlight. They will then gradually dry off, and during this drying period the flower buds are formed. After 4 to 6 weeks of drying the salmon pink kind may be replanted, when the majority of the plants will flower. If the scarlet-flowering kind are replanted at the same time they will not flower, or very few of them; they require a much longer rest, and may be kept four months or more before planting. If given a sufficient period of rest these red lilies will flower just as frely as the pink ones.

This artificial resting is merely an imitation of the natural resting period during the dry season which occurs in the country where the plants are native. Many plants from such climates can be grown in Malaya if they can be rested artificially; some require a shorter and some a longer rest to secure flowering. Trees in such climates lose their leaves in the dry season and flower before or with the new leaves. We cannot dry off these trees in Malaya as we do the bulbs, and it is only those which are sufficiently adaptable which will thrive in our climate; and even they are often very erratic in their behaviour because they have not a suffiicient dry season to control their life-rhythm.

Afgekia sericea.

This climber, described in our last issue, is evidently a dry climate plant which is sufficiently adaptable to thrive in Malaya. Since the last issue of the Magazine was printed, we have heard from Dr. Kerr, the discoverer of Afgekia, who says; "In its natural habitat it grows in rather dry places, and is subject to a long rainless spell, when it loses all its leaves, so it is rather surprising that it should do so well in Singapore." The Afgekia plant in Singapore has never yet become bare of leaves. The moral of this is that we can never tell what dry climate plants may thrive in Malaya until they are given a trial, and the only thing to do is to try all that we can, recording our failures as well as our successes, for the guidance of those who follow. It is hoped that this magazine will serve as a medium for the publications of such records.

Lobelias.

A plant fairly new to Malaya and well worth growing is the Perennial Lobelia. The species *Lobelia cardinalis* grows about two feet high and has long spikes of cardinal red blooms. It is easily grown from seed and when established plants are bedded out, grows well in well drained gardens. After the plant is well established it can be propagated by off-shoots or suckers, in the same way as Mischaelmas Daisies. Hybrid varieties can also be grown in the same way. The colour of the blooms varies from crimson to maroon. A smaller annual Lobelia (tenuior compacta) is also well worth growing; it has bright blue flowers, the plants are bushy and grow about 12″ high. Seeds can be obtained from Suttons, Reading.—*E. D. Butler.*

Tamarisk plants.

We have lately found a kind of Tamarisk grown by Chinese flower gardeners in Singapore for foliage purposes as a pot plant. It closely resembles a slender Cypress or similar conifer, and appears to flower seldom. Flowers are however sometimes produced, especially near the sea, and it is probable that this Tamarisk would grow fairly well in sandy soil near the sea in rather open places. There are several kinds of Tamarisk, their natural distribution extending across the drier temperate parts of Europe and Asia; the species grown here seems to be *Tamarix pentandra.* It has minute scale-like pointed leaves, with a bluish waxy bloom, on slender much-branched twigs. The flowers are small and mauve-pink in colour, in little slender sprays, somewhat like heath flowers. The plants grow into moderate-sized bushes. We have no information how long this species has been grown here, or whence introduced.

Leaf-Curl of Zinnias.

Most growers of the finer varieties of Zinnia are familiar with a most troublesome leaf-curl disease, which may cause a serious check in growth, the result being unsightly dwarfed plants and poor flowers. In a recent issue of the Indian Journal of Agricultural Science, an account is given of an experimental investigation of a similar and probably identical disease at Dehra Dun. The experiments indicate that the disease is caused by a virus, and that the virus is transmitted from plant to plant by minute flying insects ("white-flies"). Virus diseases are known in many plants, including some of the world's most important crops, such as sugar cane, cotton and potatoes. The organisms which cause them are much smaller than bacteria, and most are too small to be seen with the highest powers of a microscope. They are frequently carried from plant to plant by sucking insects.

It appears that the insect carrying the virus at Dehra Dun is a common one, feeding on a number of different kinds of plants; it carries also a leaf curl disease of cotton. Such a disease is difficult to control, as it is almost impossible to eradicate the carrier entirely. The only control measure is to spray the plants regularly, especially when young, with tuba or some similar spray which will deter insects from attacking them. Once infection has taken place it cannot be cured. The alternative might be to breed a race of Zinnias which would resist the disease; but it appears that at present all the finer kinds are susceptible.

A wilt disease of Zinnias, probably of a different origin, frequently attacks plants grown in old garden beds. Several cases have been noticed in which plants have been grown well in a new garden or a newly opened bed, but a second crop in the same bed has been a failure. Presumably this is a soil disease, and soil sterilisation is the only cure; but no critical investigation has yet been made.

Poultry.

THAT MYSTERIOUS POULTRY DISEASE.

BY

L. FRANCKE.

It was in 1927 that a mysterious poultry disease in a very severe form swept across the Peninsula and took its toll in thousands. I lost a large number; also all my ducks and turkeys.

There were numerous letters from breeders in the newspapers about it, but no one seemed able to diagnose the disease with certainty, and many mistook it for roup which it was not, although roup might have been present and aggravated the disease.

The symptoms were as follows :—

The bird went to roost apparently quite well. When it walked out of the fowl house the next morning it was seen to do so with a slow measured gait. It refused to eat or ate very little, was sleepy and lethargic, and selecting a corner it sat and moped with its head tucked under its wing for the rest of the day. But the most characteristic symptom of the disease was the diarrhoea which was of a greenish-white colour.

Four months ago the disease broke out again, and the symptoms were exactly similar. I immediately segregated the birds. Those that were atacked in a very severe form died after lingering, some of them, five and six days; the mild cases recovered. Two birds that survived contracted a slight limp in one leg, and three others a peculiar affection of the neck which at times got twisted on to its back, or between its legs, causing the bird to roll over and over in its frantic attempts to get back to normal.

I consulted the Veterinary Surgeon, Kuala Lumpur, at the time of the first outbreak, and this is what he wrote.

> "Preventive vaccination against fowl cholera (plague) has not so far yielded uniform results. In some outbreaks vaccination *appears* to have yielded excellent results, whilst in others it does not appear to have afforded the slightest protection. These different results may or may not be due to a confusion of fowl cholera and fowl typhoid which two diseases are rather similar and are only differentiated with certainly by bacteriological methods. The vaccine can be obtained in America or Europe but I regret I can give you no guarantee as to results from it in practice. In the case of an outbreak, in the absence of vaccination, the only more or less satisfactory plan is strict isolation of suspected cases. If the disease appears in a flock, they should be divided into lots of two or three birds and kept far apart, care being taken that the disease is not conveyed by the attendant during feeding time. There are no drugs of any value against the disease, and the mortality is around 100%."

In the *Malay Mail* of November 4th, 1920 there was published the following account of a bacteriological examination by the Director of the Ceylon Bacteriological Institute.

Fowl Plague.

Treatment of disease. — New Injection method.

"Dr. Lucius Nicholls, Director of the Ceylon Bacteriological Institute, in his annual report just published, states that numerous outbreaks of disease have occurred in poultry yards in Colombo and other parts of Ceylon and have caused very considerable loss to the owners. The examination of a number of diseased or dead fowls sent to the Bacteriological Institute showed that the condition is due to an organism known as *Pasteurcella Gallinae*, which belongs to the same group of bacilli as *Baccilus pestis*.

"The symptoms of the disease vary, says Dr. Nicholls. Sometimes it occurs as an acute septicaemia, when the fowl usually dies in twenty four hours or less, after it has first shown signs of sickness; frequently there is an attack of diarrhoea, hence veterinary surgeons have called the disease fowl cholera, though fowl plague or fowl septicaemia would be terms more in accordance with the symptoms. In other outbreaks the disease has been less acute and the symptoms show that the lungs have been implicated, and the fowl appears miserable and drowsy, is continually sneezing and a glary muco-purulent discharge comes from the nose and beak. The birds do not feed, their feathers are dull and bristling, their combs and wattles are dusky, and they refuse food. A bird may be sick for a week or more before it dies. Occasionally recovery takes place. The disease in these circumstances is diagnosed frequently by the veterinary surgeons as roup, but a bateriological examination shows that it is a form of fowl plague.

"Experiments were carried out for the purpose of finding a rapid and practical method of immunizing fowls to this disease. It was found that the injection of ½ c.c. of a 1 per cent suspension of dried bacterial mass conferred considerably immunity to the bird, and was sufficient to prevent the disease being acquired by the natural means, i.e. by the mouth, though not sufficient to complete immunity to the subcutaneous injection of large doses of virulent organisms. The vaccine has been supplied to two owners of poultry runs, and they found no difficulty in using it. The fowls are inoculated in the breast muscle by means of a hypodermic syringe. Not a single case of the disease occurred among the fowls which were inoculated.

"The prevention of the disease by disinfecting fowl houses and runs is very difficult, for crows and other birds are susceptible to the disease, and carry it from an infected locality to one that is not infected. Hence the innoculation of a vaccine is the most practical means of eradicating the disease."

The Second Outbreak.

After the second outbreak I wrote to a correspondent to one of the Ceylon papers on poultry matters, and I got the following reply.

> "This week I have heard from a reader in the F.M.S. to whom I had written previously in response to a complaint from him that his fowls were dying. The symptoms he describes being slightly different from the ones predominant when Psendo-pest breaks out in Ceylon, I hesitated to diagnose the trouble as being due to that complaint, but from his second letter, there can be no little doubt about it.
>
> " 'One bird that was ailing and got well" he says, "contracted a slight limp in one leg, while three others suffered from a peculiar affection of the neck, which at times got twisted on to the back or between the legs, causing the bird to roll over and over in its frantic attempts to get back to normal' "
>
> "This sort of muscular paralysis as an after-effect is often seen in cases of the spring and early summer outbreaks of the disease known as Avian Plague or Avian Pest in Britain, and also in the even more deadly malady called Psendo-pest or Newcastle disease, of which latter Ceylon poultry keepers have had such harrowing experience during the last five years.
>
> That this correspondent's trouble was caused by the same malady is practically certain, as, after its first appearance in Malaya, it has not—so far as I know—been completely stamped out.
>
> On the whole preventive inoculations against pseudo-pest have been disappointing, and so have curative ones."

I pass on the above information to those of my readers who, like myself, are interested in poultry. To sum up; drugs seem to be of little curative value and inoculation has been disappointing, so we can only hope that the day is not far distant when a radical cure will be found.

UTILITY POULTRY ON THE GENERAL FARM

BY

W. POWELL-OWEN, F.B.S.A.

Egg prices have at last gone up and now is the time to reap the benefit, as you will if your programme for this year's pullets has been well thought out.

When approaching the laying stage pullets are nervous and need from four to six weeks to get accustomed to new surroundings, fresh assistants and revised feeding.

The slatted-floor type of portable laying house gives the farmer a real advantage because where growing pullets have been so housed and shifted to fresh sites regularly they settle down almost at once to new surroundings provided they occupy the same houses.

How Production is Effected.

If pullets have to be moved from one house to another, then do the shifting at least a month before egg production commences. To move flocks to entirely fresh houses *after* laying has commenced means the certainty of many stopping production and going into a moult.

Thousands of eggs can be lost that way seeing that it may require two months or more to get back laying condition.

In addition the risk is run of colds breaking out in the pullet flocks so shifted in lay and nasal catarrh (watery nostrils are a symptom) can easily spread through the entire poultry stocks.

Laying condition must be planned for in both housing and feeding. When a flock of pullets go down with colds they rapidly lose flesh and cease production, and it takes months to feed them back into tone. This is due to the loss of appetites which accompany common colds, and if the fowls are not eating well they will not begin to produce eggs or maintain high production.

Dry mash feeding is a means of spreading colds through a flock should several pullets show signs, and as its withdrawal may mean a stoppage in egg production the best and cheapest plan always is to prevent colds.

Prevention in all poultry matters is far better than a cure. Night roosting in nest-boxes, sleeping in draughts or near open windows, outside nest-boxes with warm interiors in late summer, overcrowding, and delayed shifts will all bring about colds in between seasons.

Fed on wheat and oats during the growing stages, with free range and not more than 5 per cent. of fish meal or like animal foods in any mashes that may be given, the ideal condition will be obtainable.

Then they may go to their permanent field and houses to be fed for egg production. How nicely hard-conditioned pullets respond to good feeding!

Reprinted from "The Livestock Journal".

During the month of getting them into lay the rations must be increased and 10 per cent. by weight of fish meal, meat meal, meat and bone or such animal foods will be worked into the mashes, dry mash being always available with grain morning and afternoon, with perhaps a little wet mash at midday, especially when the birds are laying heavily.

Roosting with Full Crops.

Grain-feeding offers two main advantages, the morning quantity starting them off with exercise, and the afternoon amount sending the layers to roost with full crops.

Too much morning grain will see insufficient dry mash eaten so that about half an ounce of grain for breakfast per bird will do. Scatter it broadcast and make use of any suitable spots on range where scratching exercise can be promoted. The fowls will work up the coarse grass and the mosses, and will be happy finding grain amongst fallen leaves. Wheat and oats will do nicely until laying commences when kibbled maize should be introduced.

To feed the evening grain in troughs is a sound idea; thus given, the layers have every chance to fill their crops before retiring. To scatter the grain in the litter or on range may mean that with the darkness some flocks may be unable to find sufficient.

A New Wheat Danger.

Pullets are very susceptible to changes in feeding, so follow the principle of getting them fully used to all foodstuffs and systems of feeding during the growing stages. Do not introduce new foods, ingredients or systems once laying commences. In the maturing stages introduce a little barley if that is to be used, or such foodstuffs as kibbled maize, barley meal, alfalfa meal, etc.

To lay well means to eat well and to enjoy the feeding adopted.

Introductions of materials new to layers may result in sudden scouring and stoppage of eggs and may put them off their food.

Make changes gradually over several weeks, and, above all, get growing pullets initiated into what they are to have after maturity. New wheat will scour and must on that account be introduced gradually and not too suddenly. Add it to the old wheat at first.

Growing pullets must be brought up to dry mash (or wet) if they are to have this after maturity. Don't change over suddenly after production commences.

When pullets are coming into lay they begin to talk and appetites increase. Be ready for this and do not then underfeed. Let them have a liberal supply of dry mash where this is fed.

Where wet mash is given say at midday, as an extra, about half an ounce per bird will suffice, and with short rations of grain for breakfast the birds will eat plentifully of dry mash throughout the day and can have all the grain they will take, if in full lay, in the afternoon.

A hint.—What you take out of the birds by way of eggs put back for certain in food!

BORNEO TABLE POULTRY FARM.

As evidence of the increasing interest taken in poultry breeding for commercial pruposes, we give brief particulars, which we have received, of a farm which is being run by an European in British North Borneo. We think the information will probably be of interest to those of our readers who may have considered the possibility of commencing such a farm in the peninsula, and we shall be very pleased to put any persons interested in touch with the owner of the farm described. It may also be of interest to our readers to learn that the owner was led to take the risk and expense of importing prize strain poultry owing to his realization of the fact that if one is going to keep poultry at all it pays to keep the best, since in his opinion just as much time and labour is involved in looking after a flock of poor growing and poor laying birds as in looking after the same number of large and vigorous "worth-while" birds.

The farm was started in March 1932, with the object of producing high quality table birds for export. All stock was purchased and breeding carried out with the above object only, no effort being made to secure special egg-laying strains or "exhibition" birds. Hardiness, size, weight, and rapid growth are the points aimed at, and these objects are being attained with gratifying success. Fowls, ducks, turkeys and geese are all kept, as described below, and an incubator, the parts of which were purchased in England, and the box made locally, has been installed and operates with fair success.

Fowls.

A nucleus of Rhode Island Reds of good strain imported from the Bureau of Agriculture, Manila, was obtained and from these a number of large pullets were bred. Then, since cross-breds are generally stated to be hardier and quicker-growing in the tropics than pure bred birds, six pure Light Sussex cockerels, selected specially by Mr. Atkin, the well-known poultry expert, were imported direct from England, and six pens were formed. each with one Light Sussex cock and about a dozen Rhode Island hens. The cross-bred chicks now being obtained, almost pure Light Sussex in appearance, are proving remarkably hardy, quick-growing, meaty, attractive-looking birds. They are easy to rear, make excellent capons, and the pullets are specially recommended for mating to good Indian or Malayan Game cockerels.

Ducks.

Muscovy ducks are kept and young drakes weighing 8-9 lbs, are a very popular dish with local Europeans.

Pure Aylesbury drakes were imported direct from England and mated so successfully to native ducks that Aylesbury ducks are now being imported to enable further pure drakes to be bred and the flock greatly increased. The cross-bred ducklings are of much increased size, meaty, hardy and will, it is anticipated, prove a very profitable line.

Geese.

Arrangements are being made to import a pure Toulouse gander and goose. A gander, previously imported, was taken shortly after arrival by a crocodile. Some months must elapse before goslings become available, meanwhile local geese are kept, on which it is unnecessary to comment.

Turkeys.

Local turkey chicks were purchased last spring and the hens kept and mated to a specially selected and imported Mammoth Bronze Turkey cock. This bird did not stand the long voyage and close confinement well and nearly succumbed en route, but proceeded after arrival to put on flesh at an amazing rate until he reached 25 lbs. Breeding was rendered difficult owing to the disparity in size between this cock and the poor inbred local raised hens, one hen being killed and others crippled in the process, but the young turkeys poults obtained give every indication of growing into remarkably fine and large birds.

POULTRY REGISTER.

The Malayan Agri-Horticultural Association proposes compiling a register of breeders of pure bred poultry and such breeders are invited to send in their names to the Secretary of the Association, P.O. Box 323, Kuala Lumpur: short particulars of the breeds reared should be given stating also if stock is for sale.

It is felt that such a register would be of considerable assistance to poultry breeders in Malaya, not only because of the obvious commercial benefits it would confer, but also because it will simplify the collection of experiences of breeders and information regarding the various pure bred types to be found in this country.

IN DEFENCE OF THE NATIVE FOWL.

To The Editor,
M.A.H.A. Magazine,

Sungkai,
21st June, 1933.

Dear Sir,

Having read with great interest, and in various quarters, so much about the dreadful state of poultry in this country, and the ignorance of the native regarding same, might I, as one of many who have derived both satisfaction and advantage from keeping and studying the native fowl, say a word in its defence? Firstly a number of those who criticise the Malayan product do not appear to have stirred very far from the market-place in their examination of what they call the Kampong-fowl.

What is marketed in this country, including other things than poultry, is no criterion of what the country contains or can do.

The production of poultry for the market lies more or less in the hands of one associated body of people, who supply both the hen and the egg. It is against nature to expect that either can conform to, or maintain any particular standard.

Moreover, to be able to do this, combining to a great extent, two mutually destructive courses of procedure, shows not ignorance, but business capacity and understanding of the resources of the material out of which the profit is to be made.

Secondly if you do go to the Kampongs, you will not find one universally nondescript fowl, worthy of no fuller designation than "Ayam Kampong", in fact, if you first get hold of a good illustrated manual on the *origins* of the various domestic strains, it will probably occur to you that in importing certain thoroughbred strains to this country some people are engaging in the pastime known as "carrying coals to Newcastle."

The strains that roused Great Britain and America to a craze for keeping poultry, contrasting with their own indigenous "scrubs and mongrels" came from the East; from China, India and the Malayan Archipelago; from places where fowls had indiscriminately mated, and scratched for a living since time immemorial. It is interesting to note in this connection, that after twenty odd years of enthusiastic importing, and breeding of these, the increase in Poultry Shows over the country led to the discovery of just as wonderful strains, among the hitherto despised "scrubs and mongrels." One of these was the Sussex. ***Verb. sap.*** Similarly the kampongs of Malaya contain strains to-day that are worth working with.

The native poultry of any country is the "product of indiscriminate mating" from the view point of the man who sets himself out to breed for certain qualities, but man's interest in this is scarcely a hundred years old. That there were, that time ago, types recognisable as being distinct, seems to point to the fact that though the mating is with the fowl, the mixing of elements is with nature and the tendency is to preserve individual species. If this were not so, there would have been no individual species for man to notice and compare.

Thirdly, a great deal of this disparagement of the native fowl smacks of the poultry fancier rather than the poultry farmer. It belongs to a sort of idea that if a whole run of fowls look exactly alike they must *ipso facto* be good fowls. In Great Britain, for all the craze for thoroughbred poultry, the ordinary and prolific barn-door is still the backbone of the market because actually, almost anything that answers to the generic terms 'fowl' can be made into a 'table-bird' if caught young enough and fed to one purpose. It also, of course, has to be killed young enough, and the cult of the 'spring chicken' in Great Britain is one of the reasons why the annual importation of eggs there runs to millions of pounds where before it had been thousands, and the new-laid egg is a scarce delicacy, and paid for as such.

Up to the present I have seen no estimate of the price at which poultry improved by thoroughbred crossing, fed specially, and treated to resist epidemic disease, is going to come to market, but if a market is created for table birds on European standards, it would be as well to remember that the gastronomic cult of the chicken existed in China when Britons were painting themselves with woad. It is rather ridiculous to suppose that this cult grew up and still exists round something that the Chinese knew so little about that they had to wait some hundreds of years for people who would show them what a delicacy it really could be.

Here we have an indiscriminating market. If we create a market that demands a certain standard and is willing to pay for it, the probability is that the Chinese 'raiat' here will discover within himself a fund of useful information on the subject of table-poultry that up to the present he has had no need to employ, and he will have control of the supplying of that market long before the European, with his big initial expenditure, can afford to enter into competition.

As for the egg-market, the fact that a European will pay 50 cents for an egg out of which he hopes (often vainly) to get a thoroughbred fowl, is no reason for supposing that even a European housewife will pay 10 cents for an egg of the same size to eat when she can get two small eggs for 5 or 6 cents.

Fourthly; if the unfortunate planter, wants a hobby, he will find one much more suited to his purse in keeping the native fowl. It is cheap to buy, and without any straining of the aforesaid purse on special foods, is very responsive to any bettering of its conditions.

What we want in Malaya is a working classification of the strains contained in the local poultry with respect to their usefulness, general and particular, after which we might get to work and, with the material to hand, produce our own Malayan thoroughbreds.

Moreover the spectacle would be far more likely to awaken an all-round enthusiasm to do the same, than will talking to the ordinary poultry-keeper about the virtues of, to him, impossibly priced importations from other countries. Another thing is that before you can define a cross-bred as useful, you have to know more than one half of its ancestry, however noble. On that score alone selective breeding of the local poultry would be useful and informative. There are several different kinds of fowls to be obtained that lay an egg, which whatever may be said about it, in comparison with that of a Leghorn, does stand up quite well to the ordinary breakfast egg cup made in England.

It is also useful to remember that most of the poultry look a great deal smaller and skinnier than they are, owing to the fact that the fowl of the tropics is close-feathered, and the only way of testing their flesh forming capacity is by feeling them.

In short, though one could say a great deal more, for the enthusiast with a disinclination to accept the ready-made, be it a fowl or an opinion, there is a path open, which offers interest, a chance of profit, even on a low priced market, and a hope of adding a little bit to the history of the domestic fowl. It is the trial of the 'Ayam Kampong' in all its various guises.

As to the epidemics of disease, undoubtedly prevalent: the ordinary barn-door is no more easily a victim than the thoroughbred, and situation rather than feeding is the best safeguard.

Naturally, I can offer no opinion as to the cause of these epidemics, or the nature of the disease itself. It appears to be the same as that for which Pasteur prepared his first preventive vaccine when it had become a menace in Europe, Africa, America and Australia. It was simply called chicken cholera, and then as now attributed to insanitary conditions.

I have heard it said that the 'raiat' is not interested in combating this, because as he does not feed his fowls, they cost him so little that he can comfortably cut his losses. People who have bought a fowl from the market with the laudable intention of fattening it up, and found it lying stiff and stark the following day could offer a further reason for this equanimity.

These diseased, dying and dead fowl are not burnt as they should be, because the ordinary native population has no prejudice whatsoever against eating them, and the low-caste Tamils will eat them after being dead (and sometimes buried) for hours. As it does not appear to do them any harm, there is nothing to be said. Still one would like to know how far this particular form of unsanitariness contributes to the upkeep of the disease itself. That is must do a lot from the disposition in various places of disease infested entrails is obvious.

How far it is possible that man may make himself a host for the baccilli of further epidemics, is a matter for those with more knowledge than I possess.

One thing is certain. The fewer naked native feet you have padding about among your fowls, the safer you are, and the plentiful weekly use of lime will do a lot to obviate the carrying of infection by any that need to be there.

Yours faithfully,

M. J. Ephraums.

THE KLANG POULTRY ASSOCIATION.

A public meeting was held on 12th May, 1933 at the Coast Club to consider the formation of a local poultry Society, and there was a fair attendance. The District Officer, Klang, Mr. N. R. Jarret, who presided, briefly addressed the meeting and said he thought the time had arrived to take the local poultry industry in hand and give it encouragement by establishing a poultry club and he hoped that all poultry enthusiasts would give it their support, and help to carry it on. He called upon Mr. D. J. Simons the originator of the movement to give the meeting a brief outline of the objects of the Society. Mr. Simons said that the idea was to improve the breed of the local fowl, to give lectures and demonstrations, to import pure bred poultry and generally to advise the members of the Society on the care and management of the various breeds. Mr. Simons was followed by Mr. Lowe of the Agricultural Department who was present on behalf of his Department. He informed the meeting that his Department was very interested in poultry breeding in Malaya and that its officers would always be ready to give the Society their whole-hearted support.

A Committee to draw up rules was elected consisting of Mr. D. J. Simons, Honorary Secretary, Mr. L. Francke, Assistant Honorary Secretary, and Mr. A. H. Frugtniet, Honorary Treasurer.

At the General Meeting held on 15th June, Mr. L. Forbes, District Officer, presided and several Malays attended. The rules which had been drawn up by the Committee were considered and passed with certain amendments. It was decided to alter the name Society to Association to be known as the Klang Poultry Association.

It was also decided to charge no entrance fee and to fix the subscription at 50 cents a month payable in advance, the Association being open to members of all communities in Malaya.

The support already given to the Association is a very hopeful sign, there being at present nearly forty members, most of whom are Malays.

It is hoped to have a small Show in January, 1934.

Miscellaneous Articles.

THE CONTROL OF RURAL MALARIA,

BY

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The Need for it.

Most of the malaria in the world is of rural origin, and Malaya is no exception. Malaria is recognised as the chief cause of mortality in this country, and deaths due to it average about forty per cent of those from all diseases in the Federated Malay States, where eight or nine out of every ten of the deaths from malaria occur outside the limits of mosquito-control,—in other words, outside of Urban and Sanitary Board limits, and of the larger estates supervised by Medical Officers. These deaths therefore occur in what may broadly be termed rural areas, comprising a relatively large area under open cultivation, and a smaller one composed of small and, for the most part, Asiatic owned, rubber and coconut estates. The proportion above stated, namely eighty per cent or more of rural deaths to the total of deaths from malaria probably holds for the country at large, though it is lower in the Straits Settlements owing to the fact of more than half of the Colony's population living in cities and large towns. The economic loss caused by Malaria is enormous, being mainly indirect and due to loss of labour efficiency as well as of initiative and enterprise. If we accept the late Sir Andrew Balfour's estimate of an annual financial loss of between £50 and £60 millions sterling attributable to malaria in the British Empire, £3 million annually, or in round figures 25 million dollars, is a low estimate of Malaya's loss, which is probably much more. The Retrenchment Commission estimated in 1932 that about $700,000 were expended annually by the Government of the F.M.S. on anti-malaria measures directed against mosquitoes. If we assume that only half this amount is expended in estates, and that the expenditure of the F.M.S. is half that of the rest of Malaya, we arrive at an estimate, which is probably too low, of between two or three million dollars for anti-mosquito work, which protects only a small proportion of the population and of the area of the inhabited portion of the country; and to this figure hospital charges occasioned by malaria have to be added. If this expenditure is economic, effecting savings considerably greater than itself (and rubber estates have found this to be the case) we must conclude that the economic loss due to not giving protection to most of the population must be very considerable. What is of particular interest to agricultural organisers is that this loss falls mainly upon food production, depleted energies leading to diminished efficiency of cultivation; and, more than this, that the menace of malaria caused by felling jungle restricts the agricultural expansion normally needed by a growing population increased by immigration. But Malaya's need to expand her cultivated area is abnormal, and among oriental countries unique, since she imports most of her food stuffs. A final consideration is that while every town and protected estate outside the healthy coastal rice-belt is hemmed in by malarial infection and is invaded by infective mosquitoes which lose no opportunity of laying eggs and starting new broods, risk is incurred by the slightest relaxation of anti-malarial efforts, and in most places, however thorough they are, they do not afford complete protection, because infected anophelines and men come in from outside. For these reasons the malaria in towns, and also that on estates, though greatly reduced by thorough going measures of control in recent years, reflects the conditions prevailing outside their borders, being greatest in those whose surroundings are most malarious.

Principles.

The principles directing the control of rural malaria must accommodate themselves to two facts: firstly that the cost of effecting it by current urban procedures, exemplified by the figures quoted above, would be prohibitive, even if an army of trained subordinate health workers were available to cover the country; and secondly that rural areas, with few exceptions, lie outside the possible range of skilled medical control. To those facts may be added the further one that oil, which is the only generally used medium for combatting mosquitoes is ruinous alike to crops and fish, and could not without added high cost, be transported to roadless kampongs and squatters' huts.

Three principles conditioning the control of rural malaria may therefore be stated. The first two are determined by necessity, and the last by economy, which is also a necssity :—

1. The methods of control must be simple enough to be supervised by laymen, and to be practised by villagers themselves.
2. In the absence alike of trained anti-malarial staffs and of the money to provide them, self-help must be the guiding principle.
3. The materials used to effect control until new ones are available, (such as possibly cheap relatively insoluble forms of copper) which are far more effective for their cost than oil, must be obtained locally and be cheap or cost nothing.

The methods to be discussed fulfil the last condition since they utilise only the water itself in which the mosquito breeds, coarse and costless vegetation, and such subsidiaries as fish, which turn expenditure into gain. They exemplify a class of remedies, which also includes soils unsuited to malaria-carrying mosquitoes, which are of long-lasting effect and therefore labour-saving. But before coming to these a third and essential feature of rural control must be briefly considered.

Organisation.

Nothing works without parts and impelling energy, and constructive and directive intelligence supplied with the necessary knowledge. The will to conquer will secure victory, but this must be organised. The complete control of dangerous mosquitoes in rural districts is, it must be admitted, at present an unattainable ideal, but it is worth while to diminish malaria year by year. Much may be done in a short time by a vigorously conducted campaign if there is anyone among those in authority sufficiently interested to implement the work. Let it be started in at least one village, preferably a malarious one, in each State; which will serve both as a testing and a training ground. What help I can give is for the asking. Mr. Charlton Maxwell in his book on Malaria Control (Malaria Control pub. by Kyle, Palmer & Co., Ltd., Kuala Lumpur, 1930 one dollar), has sketched an organisation centering in the District Officer, and I can only add one or two supplementary suggestions.

1. If District Officers, or perhaps the Residents, must supply directing and organising energy, there is no reason why the public should not contribute stimulus and approval, nor why its individual members, especially owners of uncontrolled estates, and rural notables, should not provide voluntary workers.
   Government Officers of all departments and of all grades whose work lies among kampongs, should acquaint themselves with what needs doing, and encourage it to be done.
2. Co-operative Societies, Schools and Training Colleges should be pressed in to help.
3. A demonstration area should be maintained in each State, or preferably in each District, and courses of practical instruction should be given on it, say for two months each year from April to June. But a great deal might be done in one month, and it might be better to hold the courses twice a year.
4. The men attending these classes should be very carefully selected and be returned to look after half or three quarters of a mile round their kampongs, or round a group of small kampongs. Others, when the organisation developed, might have itinerant duties and be made responsible for instructing or supervising squatters, a class which suffers very heavily from malaria. These men might be rewarded by a small grant of land where unalienated land is available; otherwise by a small wage which would repay itself a hundred-fold, and by special privileges. But above all they will need encouragement, and visiting Officers of all Departments should not fail to enquire into their work and see as much of it as possible. This should be regarded as part of their departmental duty, since the conditions of health which enable work to be done by those, such as School Masters, whom they inspect,

are as important as the work itself. To encourage village larva-hunters they might be issued certificates of increasing splendour to commemorate good work—a plain one after five years, one with a red border after ten, and a silver-bordered one after fifteen, finishing with a silver medal after twenty years of approved service entered in a service book. These things would become heirlooms and stimulate sons to emulate the fame of their fathers.

5. Finally I would suggest that every rural school should look after its immediate surroundings, carrying out simple draining and sluicing, and practicing the simplest of all methods of control, namely herbage cover, while the hunting instincts of the pupils found play in collecting mosquito larvae, to be examined through a hand lens. This work might to done, as school gardening now is, with combined pleasure and profit. And an aquarium with larva-eating fish would provide living tombs for the spoils of the chase—*ikan belaga*, the Malayan fighting fish, adding incident (though somewhat cruel and to be discouraged) as well as splendour to the proceedings.

Natural Methods Serviceable for Rural Control.

Strictly speaking, the natural control of mosquitoes is what occurs in undisturbed natural surroundings, as for example the absence or, (according to recent but incomplete evidence in the Highlands) the dearth of *A. maculatus* brought about by virgin jungle. By an extention of meaning it may reasonably be held to include the regulation of mosquitoes brought about without design by agricultural processes etc. By a further extension of meaning, the word "natural" may be applied to similar control deliberately effected in imitation of natural processes which may be intensified, extended in range, or made to operate with greater regularity than in nature, as for example when artificial sluicing perpetuates and reproduces at short intervals the occasional sluicing due to heavy rain.

The natural causes which regulate the abundance of mosquitoes are very varied. Generally speaking too much has been expected from fish and water insects. Fish are never present in the shallow pools and seepages where *A. maculatus* generally breeds, and though the species like *Panchax* (the small fish with a white spot on its nose) are very efficient, they are difficult to maintain except in permanent water. They should however be bred by the million and put into such places as rice fields; and insects like water-boatman, which are very destructive to larvae, in the same way be introduced into might carp-ponds, where larva-eating fish are not found. On the other hand hardly anyone realises or will even believe in the tremendous potency of the character and surroundings of the water where dangerous mosquitoes might, but are not allowed by nature, to breed. The Periyar river in Southern India which was once non-malarious, or only slightly so, was rendered highly malarious by the prevention of natural sluicing through drawing off supplies for irrigation from its head waters. And conclusive illustrations from Malaya of the powerful effect of environment are the absence or extreme rarity of *A. maculatus* in shaded jungle (the opposite being true of *A. Umbrosus*); and the absence of the former from the whole of the flat coastal plain except within a few yards of the feet of the hills which pierce it at places like Jugra and Kuala Selangor. Without going into theories unsuitable for discussion in the present article which is directed to convincing the reader that wider practical efforts are needed and are possible, it is virtually certain that the open coastal plain is kept free from *A. maculatus*, and practically free from malaria, by the nature of the water in its fields and pools. Sir Malcolm Watson (then Dr. Watson) indicated one cause in Krian, namely the rotting, of vegetation in the water in the rice fields,—fresh green vegetation, which is far more potent than such things as dead leaves which produce quite different results. And when at his suggestion I made a vacation tour in Malacca in 1927 to find out if possible, why, though no vegetation is thrown in to rot in the rice fields there, the coastal districts alone are healthy, it was found that the soil in the fields was much richer in the accumulated products of decay than the soil in the malarious hills and hill-valleys; the soil moreover being water-logged for half the year so that air does not reach and purify it. Sir Malcolm Watson himself in a lecture reported in the "Malay Mail" of 21st June 1910 prophesied that by only slightly altering the character of breeding waters we shall be able to control mosquito breeding completely, remarking that he believed that in this way "a great anti-malarial method will be evolved," and "Drainage schemes" (typifying costly artificial control generally) "will become matters of the past; and future generations may smile to think how their ancestors who thought themselves so clever burned the house to cook the pig." We are on the threshold of the new era here predicted, which, if we do not inaugurate, others may, although Malayan chemical and biological research, as well as the brilliant pioneer work of Senior White in Ceylon and India has led up to it. It is sometimes urged that we must wait, perhaps until another generation has passed, for complete scientific knowledge before attempting practical control on new lines. But this is the argument of these who love delay, even in life-saving, and is contradicted by the history of every practical art from brewing and baking to boat-building and cheese-making. Those who want to do things do not need to be told by academies that they may do them. And the argument entirely overlooks the fact that while science may continue to dispute about the number of millionth parts of this or that which the water must contain, now that we know the *kind* of effect wanted to abolish malaria, we can produce it in unlimited excess by availing ourselves of the prodigal bounty of nature,—especially in a country like Malaya, of its limitless supplies of vegetation. But we need not depend for success only upon vegetation. The movement of water, itself, and the properties of the soil may be turned to account, and may produce results as good as, and sometimes superior to those of oiling at its best. I can barely do more than name some of these methods, describing only one, which may perhaps prove the most useful of all, more fully, namely the hitherto unannounced method of herbage-cover. But I hope to show the working of most of them (as well as of others) at the forthcoming Exhibition. If the line of work indicated is followed in other places besides the Highlands and for other species than *A. maculatus*, other methods which utilise the common materials of the country-side will be discovered. The patience and skill of many workers is needed to achieve complete success in so large an endeavour as the control of rural malaria, and the methods useful in rural districts may prove helpful in other places. It is important to bear in mind that a new method of control should not displace others already in use unless it is suprerior under all conditions. The ideal is to have the choice of many methods working in harmony; economy and efficiency resulting from using each in the right place and at the right time. Neither oiling nor sluicing nor any single method is suitable everywhere, nor to every occasion. Oiling, it is to be remarked, is unsuitable for use where either crops or fish would be killed by it.

The methods given below are named in reverse order to what appears to be their general usefulness in dealing with *A. maculatus*, but it may be otherwise where other species of mosquitoes are concerned; and for any particular species everything depends upon the nature of its surroundings. Successful mosquito-control as practised by our Health Officers calls for practical judgment applied in concentrated small doses, from yard to yard, but procedures much more varied than in the past, should be available for dealing with the very varied conditions under which mosquitoes breed.

(To be continued.)

HINTS TO THE NOVICE HORSEMAN.

While the art of riding can only be acquired by constant practice and long experience, there are certain principles which may be impressed on the beginner before he climbs into the saddle.

First, as to mounting. Stand opposite to the near forefoot of the horse, and place the left hand on the neck near to the withers, having the back of the hand to the horse's head and the reins lying in front of the hand. Take up the reins with the right hand, put the little finger of the left hand between them and draw them through until you feel the mouth of the horse; turn the remainder of the reins along the inside of the left hand, let it fall over the forefinger on the off side, and place the thumb upon the reins. Round the thumb of forefinger twist a lock of the mane and close the hand firmly upon the reins.

Take the stirrup in the right hand and place the left toe in it as far as the ball; let the knee press against the flap of the saddle to prevent the point of the toe from irritating the side of the horse.

When in this position take hold of the cantle of the saddle with the right hand, and, springing up from the right toe, throw the right leg clean over the horse, coming gently into the saddle by staving the weight of the body with the right hand resting on the right side of the pommel of the saddle; put the right toe in the stirrup. The length of the stirrup leather is determined by the length of the rider's legs.

The rider should then place the bridle-hand in its proper position, which is immediately in front of the body and three or four inches from it. The hand should be perpendicular to the pommel, so that the knuckles may be opposite to the horse's ears; it should be on a level with the elbow and sligthly rounded outwards at the wrist. The hand being in the right position, the reins must be sufficiently tightened to have a full bearing upon the horse's mouth. By the reins being drawn through the hand, and having a half-round turn over the forefinger, with the thumb firmly pressed upon them and the hand well closed, you have the strongest possible grasp that can be made consistently with good riding.

Sit Straight.

The position of the body should be perfectly upright and straight to the front, having the waist drawn inwards, but without any appearance of stiffness. The lower limbs should hang nearly straight down, with the knees slightly bent, having the feet immediately underneath the knees, so that to the view of the rider the knees will appear to be almost in a line with the face and the feet, the fore part of the feet only being visible.

The Walk.

The rider urges the horse to walk by the pressure of both his legs, feeling the horse's mouth equally with both reins. In walking straight forward, the bearing upon the horse's mouth is made by turning up the little finger inwardly and gently towards the breast from the action of the wrist alone, the hand remaining well closed upon the reins. In moving straight to the front the pressure of the legs is equal, also the bearing upon the mouth with both reins.

To incline the horse to the right, increase the bearing upon the right rein and the pressure with the left leg. The bearing upon the right rein is made by turning up the little finger outwardly towards the left shoulder, and the pressure by the left leg is increased in order to prevent the horse from throwing his hindquarters too much outwards or to the left. To incline the horse to the left, increase the bearing upon the mouth with the left rein, and also the pressure with the right leg.

Turning.

To turn the horse completely to the right, the bearing upon the right rein and the pressure with the left leg, are increased in force; and to turn to the left, similar bearings and pressure are required with the left rein and the right leg. To turn to the right-about the horse is brought to a momentary halt, and the extra bearing upon the right rein and the extra pressure of the left leg are continued until the horse is completely turned round.

Trotting.

In trotting press the horse firmly with both legs, together with a bearing upon both reins. Let these pressures be continued more or less during the whole of the trot according to the pace with which you desire the horse to move. These pressures tend to collect the horse in his pace and prevent a straggling action.

The rider must learn to find his balance, so that he may be perfectly independent of the support derivable from the stirrups and the bridle. In rising in the stirrups in the trot, the action must be an easy motion, taking care that the feet and legs are not thrown either backward or forward. The body must remain perfectly upright, as in the walk, with the small of the back well drawn in.

In inclining to the right and left, in turning to the right and left, and in turning to the right and left about, the bearings and pressure are precisely similar to those which are used in the walk, but in more intense degree, and the horse must be momentarily halted before the turn be commenced, otherwise he will describe a large circle before he has completed the movement, instead of turning about upon his own ground. The rider must be most particular upon this point, since he may be frequently placed in difficult positions, in which the collected action of the horse may save him from the greatest injury and peril.

When the rider has perfect command over the horse in the trot he may commence with the pace of the canter. As the bearings and pressures were increased to compel the horse to trot, so must they be further increased to urge him to canter. He must not be allowed to canter with either foreleg leading at his own will, but must be made to do so at the will of the rider.

Cantering.

To canter with the right or off foreleg leading, the extra bearing must be made upon the right rein, and at the same time the pressure with the left leg must be increased. If the horse refuses to strike into the canter by the pressure of the leg only, then use the spur instantly or strike the whip across the left shoulder. To canter with the left or near foreleg leading, make the extra bearing upon the left rein, with the pressure of the right leg or spur. As long as the horse remains in the canter the rider must continue to use the same pressures in a modified degree.

When the right or off foreleg is the leading leg, the extra bearing upon the right rein and the additional pressure of the left leg should immediately cease, and the horse is urged to canter with the near foreleg leading, by the aid of the left rein and the right leg. Again, when the horse is cantering, with the left or near foreleg leading, the extra bearing upon the left rein, with the extra pressure of the right leg, should cease, and those of the right rein and left leg be substituted. When the horse is perfectly collected in the slow canter, the pressures are increased.

The gallop is a further increase of pace upon the full canter, and therefore will generally require an increase of the pressures to excite the horse to extended action. In horses of high courage this increase of aids is scarcely requisite, a slight relaxation of the reins being a sufficient indication to them of the wishes of their riders. The rider must have a perfect command over the horse during the swiftest pace of the gallop.

Take hold of the reins with the right hand and slide the left hand with the reins between the fingers down upon the neck; let the right hand then drop the reins; twist a lock of the mane round the thumb or forefinger of the left hand; take the right foot out of the stirrup; place the hand, and close the right hand upon the right side of the pommel, and supporting the weight of the body upon the right hand and left foot, bring the right leg gently over the hindquarters, the right hand seizing the cantle of the saddle as the body descends to the ground upon the ball of the right foot.

Livestock Journal.

MENDELISM IN ITS SIMPLEST FORM.

Every pedigree breeder, whether he knows it or not employs in his work the principles discovered and tabulated by Gregor Johan Mendel. What were the principles established by this Austrian monk? Any breeder will tell you that Mendelism means: "Like begets like." This is, of course, broadly true, but Mendel's findings, even a brief summary of them, go farther than that.

Let us run over briefly what these findings were. It is well known that varieties of plants differ from one another in one or more definite characters. For instance, in both eating and sweet peas there are dwarf as well as the more common tall varieties, both of which breed true to their individual character. Now if tall sweet peas are crossed with the dwarf variety it will be found that all the offspring grown from the seed will be tall. If, however, the seed from the tall cross-bred plants is collected and planted in the following year it will be found that twenty-five per cent. of the plants grown from it will be dwarfs, the remaining seventy-five per cent. being tall.

Dominant and Recessive.

In consequence of this, Mendel applied the terms "Dominant" and "Recessive" to the characters which appear in the first and second generations respectively. He furthermore found that the Recessive dwarfs in all future generations bred true to their character and showed no signs of having been crossed. The Dominants, on the contrary, although to the eye alike, proved on experiment to be of different heredity values, twenty-five breeding pure the dominant character, in this case tall, and the remaining fifty giving rise to both tall and dwarf characters in the proportion of three to one, as at first. This ratio was obeyed when crosses were made between varieties of garden peas which differed from one another in such familiar characters as smooth seeds and wrinkled, green colour of seed or yellow, purple flowers and white, etc.

The inheritance of each character was separately investigated, and in every instance one of the two was dominant in the first generations to the exclusion of the other, the recessive character appearing in a ratio of twenty-five per cent. of cases when the cross-bred flowers were allowed to fertilise themselves

Animals and the Law

This is Mendelism in its simplest form. Matters become more complex when we deal with animals. For instance, when an Angora rabbit is crossed with a Belgian hare the progeny resemble the wild grey rabbit in colour and length of coat. When the progeny are bred together, however, all possible combinations of coat characters appear, and the breeder will eventually find himself in the possession of twenty-five per cent. of offspring which resemble one original parent, twenty-five per cent. which resemble the other parent, while the remaining fifty exhibit various blended characters between the two forms.

More curious still are the facts that phenomena so diverse as susceptibility to the attacks of "rust" in wheat, sterility in certain plants, and malformation of the labyrinth of the ear in mice, are all subject to Mendel's law of inheritance, acting as dominants and recessives, as the case may be, and reappearing in a definite proportion of cases in the next generation.

The great truth deduced from these experiments is the fact of the purity of the germ cells in respect of every character. Mendel conceived that there must be pairs of unit characters, of which either one only can be carried by the germ cell of an individual to the exclusion of the other. The union of two germ cells, as is well known, gives rise ultimately to a new individual. In the next generation in cross-breeding, if the cross-breds are bred together, character units are produced of the two dissimilar kinds transmitted by the original parents, and produced in equal numbers.

Thus it comes about that on an average a unit representing one character meets its like or equivalent, and a unit representing the other character meets its like or equivalent, resulting in the production of offspring breeding purely because they derive these qualities from both parents. In addition, dissimilar units meet together twice as often as similar ones, giving rise to the phenomenon of fifty per cent. impure individuals capable of transmitting both dominant and recessive characters in definite ratio.

TWENTY-ONE PIG PRODUCTS.

The chief products of the pig are bacon, sausages, brawn, ham, tongues, chaps, trotters, and lard from the fat.

Then we get light leather goods from the skin, brushes from the hair, sausage casings from the gut, glue from the hoofs, knife-handles and fertilisers from the bones, and feeding-stuffs for cattle and fertilisers from the blood.

Next there come rennet for cheese and curd making from the stomach, pepsin from stomach lining, albumen from the blood, pancreatin from the pancreas (or sweetbread), thyroid from the thyroid gland, and trypsin from the pancreas, with glycerine.

A MILLION CALVES IN A THIMBLE

On "Finding the Egg," or, as he put it, "Two million calves in a thimble," Mr. A. D. Buchanan Smith, of the Institute of Animal Genetics, University of Edinburgh, writes in the Ayrshire Cattle Society's Journal that there are those who say that farmers are not interested in the basic facts of science. They allege that farmers are willing to apply the findings of science, but that they do not care about the fundamental laws which govern the practice. He doubts if this is true. And certainly it does not seem to hold as regards that class of farmer who breeds stock. Scientific exploration is very much like geographical exploration. Unfortunately, in science, it is not always possible to put the deductions immediately to the proof. The deductions are made and are then used in practice, although they have never definitely been proven.

One such deduction is that the cow sheds an egg, and that this egg must be fertilised by the sperm of the bull. Following fertilisation the egg divides into two cells and then each of these divide, making four, which in turn produce eight. Sixteen cells form the next stage, and so on, for the egg increases by the multiplication of its cells and gradually the calf of the next generation is formed as the many cells each find their own function.

A Wonderful Story.

It is a wonderful story, and it all hinges on the production by the cow of that egg and the fertilisation of that egg by another single cell, the sperm which the bull produces. Physiologists, as the scientists who deal with these matters sometimes call themselves, had long ago guessed that this is what happened. The deduction was made from a variety of facts all of which helped to show that this was the case. But never had anyone seen the egg of the cow either before or shortly after fertilisation until . . . .

It was at 1.10 p.m. on March 15, 1932, in the Carnegie Laboratory of Embryology in Baltimore, Maryland, that there was recovered from the fallopian tube of a cow a two-celled egg. Here at last was proof that what we guessed did happen actually took place. The cow, No. A11, was one of the herd belonging to the Bureau of Dairy Industry of the United States Department of Agriculture at their experimental farm at Beltsville, near Washington. She was perfectly normal in every way.

Scientists Work Quickly.

She was chosen since she seemed to be a regular breeder. Her sixth calf was born in April, 1929, and she came in season on February 20, 1930, and again twenty-one days later on March 13. At 10.5 a.m. on that day she was mated to one bull, and to another some five minutes later. From the second service many sperms were recovered. Early on March 15 the bleeding was profuse. Shortly after, the animal was killed and her genital organs were, with the greatest care, removed, placed in an insulated, pre-warmed box and despatched by car to the Carnegie Laboratory in Baltimore. At 1.10 p.m. the egg was recovered. The explorers had reached to the top of the Matterhorn.

A SACRED BREED OF CATTLE.

A still existing breed of sacred cattle with a history going back to the 17th century is described by Mr. F. R. B. Thompson, Director of Agriculture, Transkeian Territories, in a recent issue of the Journal of the South African Veterinary Medical Association.

The breed is maintained by a branch of the Bomvana tribe, now occupying a portion of the Native territory along the coast south-east of Tembuland and known as Bomvanaland. While the exact origin of the variety, known as Bolowana cattle, cannot be traced, it is known to be very old. The herd is regarded as sacred, and is kept by the chief in trust for the tribe, and they cannot be dealt with or disposed of except by consent of the general council of the tribe.

In colour Bolowana cattle vary from red to dark brown and dun. They are on the small side, most are polled, or have only short horns pointing downwards. They are inclined to be wild and resemble the Afrikander more than any of the other breeds.

A Mystery.

The manner of their breeding or maintenance of the purity of the breed is a mystery, for the custom is to castrate every bull calf before it can breed, the superstition being held that bulls of the breed serving cows of other breeds would cause the latter to purify and the blood of the Bolowanas would never mix with that of other breeds.

The author expresses his inability to understand why these cattle still retain their definite type if they have to depend on other breeds for propagation. He was unable to ascertain what bulls are used, as the native councillors are not communicative on the point.

The Bolowana are used for ploughing and other draft purposes and also for racing. The cows are not good milkers, but produce more than enough to raise their calves. Men and young women do not use the milk, but only small boys and girls and old women.

For Sacrifice.

Being regarded as sacred, the principal use of these cattle is for sacrificial purposes in times of trouble and calamity When circumstances call for a sacrifice to be made a meeting of the controlling council is held, which selects a number of councillors to convey the fattest of the oxen to a certain spot in St. John's district, where it is sacrificed and other offerings are made.

An addendum to the account of these cattle, contributed by Messrs. J. H. R. Bisschop and H. H. Curson, of the Onderstepoort Research staff, states that the Bomvana herd apparently represents the most southerly of the indigenous types of cattle, and may be compared with an island of Native stock in a sea of mongrel grades. Most of the Native cattle types, it is pointed out, have lost or are fast losing their identity owing to the erroneous grading policy initiated by Europeans, and which as a result do not possess breeding value as basic stock.

PATIENCE NEEDED IN TRAINING POLO PONIES.

Like all the other tuition for the perfecting of different duties in the horse, the tuition for polo must be largely imbued with kindness and patience. No man, whatever his nationality, position, or profession may be, will ever train a pony to become expert at polo by abusing and coercing him into doing what is required of him, nor will the rider ever become proficient in the art if he does not possess the necessary patience to train his mount.

The best system of training a pony is to ride him very carefully for some considerable time, taking extreme care to make his mouth as pleasant and tractable as possible, so that at the least indication of the hand he will yield a ready acquiescence to the bit on all occasions. If his mouth is permitted to become harder at one side than the other, he will never win the distinction of being considered a first-class wheeler.

The great secret of success in training the pony is to get him to take an interest in his work. Method must always be exercised in instruction, and whenever he accomplishes any particular part of his training well the rider should never fail to caress him and speak encouragingly to him.

The best place for instructing the pony in the elementary movements of the game is a riding school of fairly large dimensions, but if this is unavailable a small park in a quiet place will serve the purpose. Like all other branches of training in horses, his first course of instruction in polo should be given in private.

In perfect seclusion his undividual attention is engaged, and he will understand with much greater aptitude than when distracted by the appearance of other riders and ponies, or even with any slight object whose presence may occasionally disturb him.

Springing into Action.

A very important branch of his work is to spring at once into a gallop from a standing posture. This is best accomplished by taking hold of the pony all over, so to speak; closing the legs upon him, feeling his mouth; and at the moment he is required to spring forward he must be "lifted" collectively with arms legs, and he will soon learn to bound off like a rocket. Of course, "lifting" him, in the ordinary sense of the word, is a mechanical impossibility.

Another special portion of his work is to stop suddenly when at full gallop, and this is best managed by collecting the pony well together with the legs, and bearing heavily upon the reins, taking care at first not to pull too abruptly until he grows accustomed to the action, or he may very easily be pulled back over the top of the rider, which is reverse of pleasant, to say nothing of the dangers attending it. In ten or a dozen lessons he will draw himself up almost upon his own ground from a full gallop to a dead halt.

The pony must be trained to turn suddenly from right to left, and *vice versa,* upon his own ground. In wheeling him to the left, his head should be inclined to the right and the left leg closed against his side, and *vice versa* in wheeling to the right. In a very short while he will learn to turn round with very great rapidity, and a good wheeler in polo is a decided advantage to the rider. After he has been thoroughly educated to move quickly and gracefully in all directions, the rider should get a polo stick and gradually accustom him to the feeling of carrying it.

Trained to the Stick.

The rider must begin by gently swinging the stick over and about him in all directions, and gradually increase the velocity as he proceeds. He must be careful not to strike him. The body should be bent and twisted over the pony in every conceivable manner, and when playing proper begins he will understand what the unnatural swinging means, and will not mind it.

As soon as the pony is familiar with the polo stick the trainer should take a ball and hold it to the pony's nose so that he may smell it, but the rider should be careful to avoid forcing it unduly upon him at first. He may appear shy a little, and may snort and move backward; but if patience is exercised, and the pony patted and spoken to encouragingly, he will soon smell it over, and if dropped on the ground in front of him he will often attempt to seize it with his teeth.

Very often the ball will roll away from him, and if left to himself his curiosity will frequently persuade him to follow it up. This may be continued until he is quite at home with it, when the rider should begin to push the ball gently about, and induce the pony, if possible, to follow it partially of his own accord, which can be materially accelerated by inclining the ball always in a favourable direction. The force should be increased as the pony becomes familiar with the work.

Getting used to the Polo Ball.

The trainer should get someone to stand well back from the pony and throw the ball towards him. This should be done very gradually at first, because, if done too hurriedly, he will shy off broadsidewise, and will naturally regard the ball with greater misgivings. As soon as the pony realises that it will do him no harm, the speed of the ball may be increased, and the distance from which it is thrown correspondingly lessened; and if care and caution are used in conjunction with kindness, he will learn all the different duties of polo, much, of course, depending on his temper and docility, together with the patience, kindness, and general horsemanship of his trainer.

After the pony is fairly initiated in his work he may be ridden in the game amongst other ponies, but great caution should be exercised to steer clear of a collision. The rider should avoid, as far as possible, all unnecessary jostling, because the pony may get a fright at first, and it would be some considerable time before his confidence was again restored. It is an acknowledged fact that he may very simply learn something in five minutes of rough, jostling work that it would take a trifle more than five weeks to unlearn; therefore, on all occasions unnecessary jostling should be avoided with a raw pony in polo. *Livestock Journal.*

AFFILIATION OF SOCIETIES, CLUBS AND OTHER BODIES TO THE MALAYAN AGRI-HORTICULTURAL ASSOCIATION.

With a view to facilitating closer co-operation between various societies which are now being formed in different parts of the country, the Committee of the Malayan Agri-Horticultural Association have drawn up rules for the affiliation of such bodies.

The rules are printed below, and it is hoped that societies interested will communicate with the Secretary of the Malayan Agri-Horticultural Association.

Any Association, Society or Club having for its objects the encouragement of interests identical with any of those which are covered by the scope of the activities of the Malayan Agri-Horticultural Association may apply for affiliation to the Association. The fee for affiliation shall be $5.00 per annum. Applications for affiliation should be addressed in writing to the Secretary, Malayan Agri-Horticultural Association on the proscribed form.

Affiliation to the Association entitles the affiliated body to the following privileges:—

(1) Two free passes (transferable) which will admit the holders to any show or exhibition held under the auspices of the Malayan Agri-Horticultural Association at any time during the show.

(2) Two free copies of each issue of *The M.A.H.A. Magazine* and in addition the right to obtain further copies of this magazine at half prices.

(3) The use of the Association's magazine as the official organ of the affiliated body and the allocation of space in the magazine for the publication of matters connected with the affairs of such a body. The amount of space to be allocated to be decided by the Committee of the Malayan Agri-Horticultural Association.

(4) A free supply of one copy of the Malayan Agri-Horticultural Association's Code of Rules and Standards for Judging at Exhibitions, and the right to obtain further copies at half the published price.

(5) Affiliated bodies shall be eligible for the grant of one or more medals and/or diplomas by the Malayan Agri-Horticultural Association. The nature and number of such grants shall rest at the discretion of the Committee of the Malayan Agri-Horticultural Association.

(6) The supply at specially low rates of medals, diplomas, certificates, place cards, judges sheets, schedules etc.

(7) The right to hire at nominal fees, poultry-pens and other available materials and requisites for the staging of exhibits at Shows.

(8) The right to submit any questions of difficulty and/or dispute arising out of and in connection with the working and organisation of an affiliated body for the opinion of and for arbitration by the Malayan Agri-Horticultural Association if desired.

(9) The right to obtain the advice of the Malayan Agri-Horticultural Association on any matter concerned with the scope, objects and working of the affiliated body.

(10) The right to seek advice on technical questions connected with the work of the affiliated body including advice on horticultural matters and the identification of plants.

(11) The right to utlise the Affiliated Societies' Badge on letter paper.

MODIFICATION OF THE PADI COMPETITION AT THE ANNUAL MALAYAN EXHIBITION.

In connection with the padi classes in the Agricultural Section of the Malayan Exhibition, it has been felt for some time that the system which has hitherto been in vogue of sending a large number of small samples (one chupak each) of padi without any attendant information regarding the size of the holding on which it was reaped or the yield is unsatisfactory. It is possible in these circumstances, and in fact it has actually occurred, for a small plot of padi grown in a school garden to receive the highest award for padi in Malaya. It seems clear in the circumstances that the system requires radical alteration.

The Malayan Agri-Horticultural Association is fortunate in having the co-operation of the Department of Agriculture in dealing with this question and the Director of Agriculture has under consideration a scheme whereby the padi competition will be organised on a much more satisfactory basis. Details or organisation are not yet complete and fuller particulars will be published at a later date.

Selangor Gardening Society

FLOWER SHOW.

The first Flower Show of the year was held at the Grand Stand by kind permission of the Committee of the Selangor Turf Club on 13th May.

Taking into account the very wet season experienced, the Show was quite a success and was well attended. Mr. Fitch's exhibit of Glorinias was by far the outstanding feature of the Show and it is interesting to know that these magnificent plants were grown from Carters (Raynes Park) seeds in 9 months.

The Corona Flower Show from Frasers Hill put up a delightful exhibit of cut flowers on which they must be heartily congratulated.

The following is a list of prize winners:—

Group.	**Sec.**	**Details.**	**1st prize.**	**2nd prize.**	**Special**
1	A.	Specimen flowering plant in bloom	S.C. Colomb		Choo Kia Peng.
	B.	—do— creeper in bloom	E.D. Butler	Mrs. Hughes	
2		Group of chrysanthemums in pots or tubs	Mrs. V. H. Winson		
3		Collection of flowering plants not less than 3 or more than 6 kinds	C.A. Fitch	Mrs. V. H. Winson.	
4	A.	Orchid, terrestial specimen plant in bloom.	Mrs. V. H. Winson		
	B.	Orchid, Epiphyte specimen plant in bloom	B.A. Lowe		Choo Kia Peng.
5	A.	Specimen ferns 3 only of a different kind	Miss Shelley	E.D. Butler	
	B.	3 specimen flowering Begonias each of a different variety	Eu Kee Eng		
	C.	Group of foliage plants	Mrs. V. H. Winson	E.D. Butler	
6	A.	Collection of cut flowers excluding Cannas	Wilkinson	E.D. Butler	
	B.	Single Vase of cut flowers excluding Cannas	Mrs. Hodgkin	Eu Kee Eng	
	C.	Collection of cut Cannas	A.R. Westrop	E.D. Butler	

Group.	Sec.	Details.	1st prize.	2nd prize.	Special.
7	A.	New introduction to local horticulture from other country or from the jungle. Specimen flowering plant	E.D. Butler		
8	B.	Three Lettuces	C.A. Fitch	E.D. Butler	
9	A.	Vegetables	Malay School, Ulu Klang.	M. School, Bukit Cheraka	
	B.	Cut Flowers	Malay School, Siputeh	Malay School, Selayang.	

E.D.B.

District Notes.

BALIK PULAU NOTES.

A meeting of rice planters was held in the District Office, Balik Pulau on the 5th May, 1933 and planting programmes fixed. Preparation of Nurseries was to start on the 18th May, 1933 and planting to be completed by September. It was anticipated that harvesting would be in January and February, 1934.

November 1932 floods did not affect last year's rice crops. The area under rice is approximately 4340 Acres. The yield was 2,048,000 gantangs approximately last year. The price ranged from $6 to $8 per 100 gantangs.

Increasing interest to improve coconut, clove and nutmeg trees is noticed. Rubber trees, which were planted during boom times were cut down.

The price of coconuts declined during the 1st quarter 1933. Towards the end of the quarter the local price ranged from 80 cents to $1-20 per 100 nuts while the Singapore Market Price was between $3-45 and $3-60 per picul of copra.

Several Malay Copra Kilns were erected on different characteristics copying from the local Chinese type. The Agricultural Department is trying its best to improve the kilns as well as the method of copra production.

CASHEW NUTS INDUSTRY.

The gum from the nuts is harmful; it blisters the skin if one touches it. There is a fair demand of the kernel, dried or fried. The kernel and apples are used for food.

The nut shell has to be cut before the kernel is extracted. The work is mostly done by women. They smear their hands with lime to prevent blisters and extract the kernel with a piece of thin iron after the shell has been cut into two.

The majority of the nuts comes from Pulau Lengkawi, Kedah besides small supplies from Batu Ferringgee and Tanjong Tokong, Penang where the above industry is carried out on a small scale.

The cashew apple crop is only reaped once a year a few weeks preceeding Durian Season. Apples are sold at 2 to 4 for a cent and the nuts from 15 cents to 20 cents per gantang. The average quantity of kernel is 2 chupaks per every gantang of nuts. An average woman can turn out 10 gantangs of kernel a day. The cost of labour is 7 cents per gantang. The kernel is dried and sold at 40 cents to 60 cents per gantang locally.

A.C.L.R., B.P.

KELANTAN AGRICULTURAL SHOW.

The first Agricultural Show to be held in Kelantan took place at Peringat School on Friday, June 30th, 1933. The site was situated about 11 miles from Kota Bharu, the capital of the State, and was chosen for the purpose because of its central situation and easy accessbility from all the main agricultural districts. Publicity was achieved by the distribution of printed schedules through Land Offices to Penggawas and Penghulus and by requesting Imams and school teachers to do all in their power to advertise the show.

A number of considerations made it advisable to limit the size of the show and only thirty classes were included in the schedule, a further four classes being added later for school subjects. All classes were open to the produce of Kelantan only.

The show was opened to the public at 9 a.m. by which time over twelve hundred exhibits had been received. Wet padi, copra and coco-nut oil classes were particularly strong and the prize winning exhibits of an exceedingly high standard though the good quality of exhibits was maintained throughout all classes.

The Irrigation Engineer staged an exhibit comprising two water-lifts operated by bullocks for the irrigation of land from wells and ditches and these proved the centre of much interest and were in constant operation throughout the day.

The Department of Agriculture, Kelantan, prepared a stand on which, among other things were portrayed in a simple fashion, the results of experimental work performed during the past season on manuring of padi in Kelantan and manuring of pineapples in Singapore. Lectures and demonstrations on plant propagation were delivered in Malay and a model of a cheap copra kiln with various priced grades of copra provided the substance for another series of lectures on the improvement of copra.

The show was crowded from the time of opening until late at night and both competitive and demonstrative exhibits were maintained until Sunday, July 2nd, when His Highness the Sultan, His Highness the Raja Kelantan and Her Highness the Tengku Maharani visited the show.

This is the first occasion on which an Agricultural Show in Malaya has been held in a country district and the very large attendance was composed almost entirely of peasant cultivators.

Prizes for copra were presented by Messrs. Boustead & Co. Ltd., while the Malayan Agri-Horticultural Association presented six medals, five of which were allocated to the best exhibits in each section and one to the Penggawa whose dareah won most prizes.

J.A.C.

THE
M.A.H.A. MAGAZINE

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Vol. III. OCTOBER, 1933. No. 4

EDITORIAL .. 166

MALAYAN CHRISTMAS HAMPERS .. 167

M.A.H.A.

REPORT OF THE TENTH MALAYAN EXHIBITION .. 168

HORTICULTURE.

ORNAMENTAL TREES OF MALAYA. By R. E. Holttum, M.A., F.L.S. 186

NOTES ON ENGLISH TUBEROUS BEGONIAS. By P. C. B. Newington 191

GARDEN PLANNING IN MALAYA. By F. Flippance, F.R.H.S. .. 193

HINTS ON THE USE OF FERTILISERS. No. 4. Ornamental Trees and Shrubs. By A. R. Westrop, N.D.A., P.A.S.I. .. 199

MISCELLANEOUS.

THE CONTROL OF RURAL MALARIA. By K. B. Williamson, M.A., DIPLOMA AGRICULTURE (CANTAB), D.I.C. .. 201

SELANGOR GARDENING SOCIETY.

SOCIETY NOTES .. 207

THE

M.A.H.A. MAGAZINE

OCTOBER, 1933.

EDITORIAL.

This number contains a report of the Tenth Malayan Exhibition which was held in Kuala Lumpur in August and although it has been necessary in consequence to hold over other matter, we do not think any apology will be required by our readers for dealing at length with this important annual event.

In our last issue we dealt briefly with the commercial aspect of the Exhibition, and that our argument was sound was proved, we venture to think, by the satisfactory results achieved by those firms which had the foresight to book stalls in the trade section.

We are now concerned, however, with drawing attention to the competitive sections which possibly are somewhat overshadowed by the more elaborate display usual in the trade stalls.

The Agricultural Section is almost entirely the small-holders' preserve and it is an extremely important one. In England of late years, we have seen the growth of communal allotment gardens, which, while principally providing a hobby for city workers, have also proved remunerative. Here in Malaya small-holdings are not a hobby; they represent a livelihood and a definite advance in the agricultural development of the country and they owe in large measure their improvement in recent years to the hard and enthusiastic work of the officers of the Agricultural Department.

At the Exhibition we see the results of this work. The exhibits come from all parts of Malaya due to the co-operation of District and Agricultural Field Officers who, each year undertake the collection and dispatch of produce from their districts.

A large number of exhibitors are provided with free railway transport to the Exhibition by the Malayan Agri-Horticultural Association and are thus able to compare their own exhibits with those from other districts and states. If their exhibits are inferior, they have an incentive to better cultivation during the next year; if they are prize winners, they go back to their kampongs with their medals and "surats" and with the incentive to win more prizes at the next Show.

The competitive sections are therefore of considerable importance, and of increasing importance as was evidenced this year by the much larger floor space required for the agricultural, oils and fats and poultry exhibits.

Horticulture. We appeal to our readers who are interested in gardening to let us have articles for publication in the horticultural section. If you can grow any kind of plant better than most other people, your experience is worth putting or record. Nearly every kind of plant has some special cultural conditions which suit it best, and these can only be found out by trial. If you have a new idea, other gardeners would like to know about it or if you have been successful with some new or unusual plant, that also of interest; even short paragraphs would be welcome.

We are particularly interested in the development of ideas about garden design, and for that reason we have asked Mr. Flippance to write the serious of articles now being published. We were also very glad to receive Mrs. Newell's article, published in our last issue. Garden design is a matter which has received far too little attention in Malaya, and has great possibilities. With our peculiar conditions and the particular plants at our disposal, design may perhaps best develop on lines rather different from those most suitable elsewhere. This is a matter on which there is scope for a great variety of opinion. Perhaps some reader may object to Mr. Flippance's ideas, and have something different to offer; in that case we shall be gald to hear about it. We hope at least that articles on this subject may lead Malayan gardeners to devote more thought to it. Mr. Flippance's articles are concerned with the adaptation to local conditions of western ideas on garden design. There are in the East traditions of garden design of a quite different nature, and the adaptation of these for Malayan gardens offers also much scope for thought and experiment.

MALAYAN CHRISTMAS HAMPERS.

Attention is drawn to the scheme developed by the Malayan Agri-Horticultural Association for the delivery in Great Britain of Christmas Hampers of Malayan manufacture and containing only Malayan produce.

The Association in this way makes a serious attempt to reach people at home and to create a demand for Malayan goods. Malaya is so often vaguely known as a country of rubber and tin that it is quite time we all united to impress on the outside world the fact that we have vast agricultural resources which at last are being tapped.

Full particulars of the scheme can be obtained from the secretary of the Association, P. O. Box 323, Kuala Lumpur.

The Malayan Agri-Horticultural Association.

TENTH MALAYAN EXHIBITION.

The annual Malayan Exhibition was held as usual this year during the August Bank Holidays, the 5th, 6th and 7th August, in the Association's grounds at the junction of the Ampang and Circular Roads, Kuala Lumpur.

The weather was fine throughout the period of the Exhibition but, probably owing to numerous counter attractions the attendance was slightly lower than last year, the official figure being 20,527.

Considerable alterations had been made in the lay-out of the Exhibition and that they were considered an improvement was evident from the general comment of visitors.

The old tier form of benching had been replaced by tables which presented a much more attractive appearance and coupled with trade stalls extending right down to the entrance of the right hand side of the building created a more favourable first impression of the Exhibition than hitherto. A long extensive attap building divided into three sections housed part of the Agricultural Section, the Poultry and Horticultural Sections, and being joined to the permanent building at each end, made it possible to visit almost the whole of the exhibition under cover.

The Opening Ceremony.

The Exhibition was officially opened at 11 a.m. on Saturday, the 5th August by the Honourable Mr. M. B. Shelley, M.C.S., Acting Chief Secretary to Government, in the presence of His Highness the Sultan of Selangor, the Raja Muda of Perak, the Raja Muda of Selangor and a large gathering.

Mr. F. W. Douglas, President of the Association, in a preliminary speech briefly outlined the extent of the Exhibition, pointing to the improvement in lay-out and increase in all sections. He drew attention to the fact that tentative judging standards had been prepared to cover the various competitive sections, and which it was hoped would be published in permanent form thus forming a basis for judging at all shows throughout Malaya. In conclusion he thanked the section secretaries and judges for their voluntary help which made the organisation of the Exhibition possible.

Mr. Douglas then read a telegram from His Excellency the High Commissioner wishing the exhibition every success.

The Honourable the Chief Secretary in declaring the Exhibition open pointed to the progress which had been made in broadening the agricultural basis of Malaya and to the noteworthy increase in rice production and the area under padi.

He stressed, however, the fact that one of the defects of Malayan agriculture is that too often produce tends to fall below the standard which is demanded of the best grades in the markets of the world and he paid tribute to the work of the Agricultural and Co-operative Departments in their efforts to secure improvement in the quality of the small-holder's produce and in the arrangements for marketing such produce.

After commenting on estate agriculture, the striking advances made in the oil palm industry and the development of tea planting on Cameron Highlands, the Chief Secretary referred to the Malayan pineapple industry which was threatened with serious competition from other countries. He pointed out that the industry is a valuable one and one of which the exports have steadily risen, their value in 1932 approaching eight million dollars.

The Chief Secretary concluded by stressing the value of the Exhibition in assisting in broadening the basis of agriculture in this country, saying that it constitutes a valuable contribution towards tiding over the difficulties that beset Malaya.

A vote of thanks was proposed by Dr. H. A. Tempany, C.B.E., Director of Agriculture, S.S. & F.M.S. and seconded by Mr. J. Hands, M.C.H., Vice-President of the Association.

Sections of the Exhibition.

The Exhibition was composed of four main sections:—Competitive, Trade, Village Industries and Government Department Exhibits. We will deal with these sections in detail.

Competitive Section.

Agriculture.

Hon. Section Secretary. Mr. R. B. Jagoe, Department of Agriculture.

Group 1. Cereals.

There were a large number of entries in the two most important classes, 1 (maize) and 3 (wet padi), and the average quality was high.

The total number of exhibits in this group was lower than for the last couple of years but this was due mainly to a diminution in the number of poor quality exhibits, and the general standard showed a slight but distinct advance on previous years.

The first prize for maize was won by Haji Hasanuddin bin Haji Bashir, Ulu Langat and the first prize and gold medal presented by the Hon'ble Mr. M. B. Shelley, Acting Chief Secretary to Government for wet padi was won by Abdul Jamil bin Haji Hussin, Balik Pulau.

Group 2. Minor Economic Products.

Here there was an advance in both numbers and quality and though there were considerable improvements in bench space, several of the classes were still unavoidably crowded.

There were a good number of exhibits in the classes for coffee, tapioca, tobacco, sugar, tea and betelnuts, and there were some excellent cloves from Penang.

This section is a large one, composed of a great variety of classes, and could with advantage to arrangements for display and for judging be separated into three groups as follows—(a) A group including Tea, Coffee, Tobacco etc., (b) Food Products, and (c) Spices.

The Sultan of Selangor's Gold Medal for Canned Pineapples was won by Goh Hock Huat of Klang. (The Malayan Pineapple Co.)

Two other interesting exhibits were samples of fine brown nipah sugar and of nipah molasses sent by Tinggi River Estate, Kuala Selangor, and a display of grades of tea from Changkat Kinding Estate, Tanjong Rambutan, Perak.

Group 3. Fibres.

This group was as usual a small one, but comprehensive, and a fair number of exhibits was received for most of the classes. The standard in general was high, particularly in the classes for manufactured ropes. The majority of the prizes were won by exhibits from Penang and Negri Sembilan.

Group 4. Fruits.

The best classes in this group were those for Pineapples, Durians, Langsat, Pomeloes, Mangosteen and Melons. There were also some good Rambutans and Pulasans. In these the numbers of exhibits were satisfactory, and the quality was distinctly good. Many of the other classes, however, were a bit disappointing as regards either numbers or quality.

Judging could be more easily standardised if Fruits were sub-grouped in (a) Citrus, (b) Soft Fruits, and (c) Hard Fruits.

Group. 5. Vegetables.

Most of the best vegetables were in the classes for collections grown by Chinese Market Gardeners, School gardens, and Kampong Home Gardens.

In these classes competition was keen, particularly with collections grown by School Gardens, while the vegetables grown in Home Gardens were encouragingly good, though lacking a little in variety which is hardly to be wondered at.

The best of the general classes were those for cabbages, cucumbers, gourds, Chinese cabbage, mustard and kidney beans, the cabbages being notably good. Some of the classes such as beetroot, lettuce, carrots and celery were poor while the remainder though strong in numbers of exhibits were only of average quality.

There was a very good display of hill vegetables by the Manager of the Government Farm, Fraser's Hill, and the School of Agriculture, Serdang, put up an excellent collection of vegetables grown by the students. Both of these exhibits were awarded silver medals.

There was, in addition, a large display of well grown hill vegetables put up by the Cameron Highlands Association.

Particular mention must be made of the invaluable services rendered by Malay Officers of the Agricultural Department, from the various districts of Selangor. The work entailed in arranging the exhibits in the Agricultural Section was extremely heavy and these officers worked throughout the night prior to the opening of the Exhibition.

Oils and Fats.

Hon. Section Secretary. Mr. D. W. McCrow.

Group I, for small holders only, included classes for kiln-dried copra, coconut oil, gingelly oil and gingelly cake. By reason of experience gained at previous exhibitions, it was decided to limit this group to these four classes.

Group 2, for estates and manufacturers, included classes for kiln-dried copra, citronella oil, other essential oils, coconut oil, palm oil, other fixed oil or fat, copra cake, palm kernel dried for export, groundnut oil and groundnut cake.

Group 1.

The outstanding feature of the section was the great increase in the number of exhibits of small-holders' kiln-dried copra and the excellence of their quality. The Gold medal was won by Dato Muskam of Kuala Selangor, who also secured the special prize of $10/- given by a well known Perak planter for this class. In addition it was decided that the Silver Cup presented by His Excellency Sir Cecil Clementi G.C.M.G. for the most outstanding exhibit in the Agricultural and Oils and Fats Sections should also be awarded here on account of the great advance in and importance of this class as well as the excellence of the exhibit.

The second prize (silver medal) in this class was won by Haji Salleh bin Haji Ahmat, Temerloh, Pahang. The judges had some difficulty in awarding the prizes owing to the high standard of so many of the exhibits. This is welcome evidence of the response of small-holders to the instruction of officers of the Department of Agriculture in an endeavour to improve the quality of Malayan copra.

There were also a large number of exhibits in the class for coconut oil and several were of very high quality.

The native method of obtaining coconut oil is by expressing it under pressure, from the grated meat, after heating; then cooking the oil again to evaporate the water which is expressed with it. A number of the exhibitors while evidently very keen to produce a colourless oil failed to appreciate the importance of getting rid of the last trace of water and their oil thus turned rancid after a few days.

There were only a few exhibits of gingelly oil and no exhibits of gingelly cake.

Group 2.

Four exhibits were received in the class for estate copra. The gold medal was awarded to Bagan Datoh Estate, and the silver medal to Chersonese Estate.

There were only two exhibitors in the classes for groundnut oil and cake and there were no exhibits of coconut oil or cake.

Seven oil-palm estates sent in exhibits of palm-oil and kernels. All the palm-oil exhibits, though commercial samples, were of a very uniform high grade, and the awards were made on the results of the analyses for f.f.a. The gold medal was won by Elmina Estate and the silver medal by Fermanagh Estate.

The best exhibit of palm kernels came from Plantations Hallett, Ltd. and the next best from Elmina Estate.

Home Section.

Hon. Section Secretary. Mrs. S. G. Grant. *Committee*—The St. Andrew's Ladies Work Party.

This section is the development of Group 6 of the Agricultural Section. It had been felt for some time that this group should be organised as a separate section and this was achieved this year, the section proving very popular and a complete success. Several new classes were added, the most interesting of which being a twenty minutes' cookery competition for which electric stoves were provided.

Other classes covered preserved fruits, pickles, jams and jellies, cakes, bread etc., and in all cases were divided into open and asiatic, or amateur and professional to enable judging to be carried out on an equitable basis.

The section was effectively decorated to represent a kitchen, which appearance was enhanced by the electric stoves kindly lent by the Electrical Department and by a display of cooking utensils kindly loaned by Messrs. John Little & Co., Ltd.

Horticulture.

Hon. Section Secretary. Mr. E. D. Butler.

This section was housed in an even more spacious building than last year and proved a very cool and refreshing haven to which to turn after visiting the more crowded main Exhibition building.

The outstanding exhibit was undoubtedly the herbaceous border shown by Mrs. Napper and which was awarded a special prize. The border was made up of cut flowers "planted" very carefully in turf contained in a long frame and was obviously the result of long and painstaking work. A report of this section would not be complete without reference to the display made by Mr. C. Van Dort of the Vanda Flower Shop, Kuala Lumpur, whose stall was awarded a silver medal.

Poultry.

Hon. Section Secretary. Mr. A. L. Shelton-Palmer.

This section was considerably larger than last year and the general standard of exhibits was very high. Mention must be made of a very fine consignment of Cross Sussex and Rhode Island birds together with Ducks and Turkies which came from the Borneo Table Poultry Farm, British North Borneo and which won three first prizes and one second prize.

An incubator was an exhibit which created considerable interest as also did the Egg stall of the Co-operative Societies Department mentioned elsewhere in this report.

Cats.

Hon. Section Secretary. Mrs. A. L. Shelton-Palmer.

The Cat Show was held as usual on the last day of the Exhibition and a satisfactory number of entries was received, exceeding last year's figures. Nearly all the local exhibits were Siamese but in the cross breed class two prize winning cats had travelled all the way from Penang.

Weaving and Needlecraft.

Hon. Section Secretaries. Miss Foss and the Inspector of Schools, Selangor.

This year was marked by the number and the variety of the exhibits; in fact so much work, and really excellent work was sent in for the machine section that it has been decided to make it into a separate section next year. It was very pleasing to see exhibits from all parts, Trengannu, Johore, Singapore, Pahang and some really excellent work from Kedah. This state is much to be congratulated on their work. In previous years all the prizes had gone to Selangor, but this year they were evenly distributed, Penang, Kedah and Seremban each carrying off more than one prize. For the first time stencilling and Batik work was sent in from boys' schools from Kuala Lumpur and Singapore. This is very much to be encouraged and it is hoped that many more will compete next year. The school exhibits were only from English schools in Kuala Lumpur and we hope that next year other centres will send in general exhibits for this section too.

Malay Schools Section.

Hon. Section Secretary. The Inspector of Schools, Selangor.

This section was marked by more varieties of exhibits this year. For the first time there were classes for Pongkis and Brooms, Ropes, Walking Sticks, Pottery Work, Book-binding and Batik Cloth in addition to classes for baskets which formed rather a monotonous feature of the Malay Schools Section in previous years.

The Malay Schools Section has usually been by itself a large section and should in future have a separate Section Secretary. Exhibits were received from Singapore, Penang, Malacca and all the Malay States except Trengganu and Perlis and the number of exhibits coming from such states as Kedah, Johore and Kelantan is expected to increase in future. In 1933 the Inspector of Schools, Selangor was responsible for the Malay Schools and the Weaving and Needlecraft Sections with the result that all correspondence and exhibits for the two sections were addressed to the Selangor Education Office. The experience gained from such arrangement shows that it would be in the interest of the exhibitors and the exhibition if the Weaving and Needlecraft Section, which was not confined to school exhibits alone, were dealt with by a separate Section Secretary.

Every year a large number of unsold exhibits, mostly baskets not entered for competition, have to be returned. It is suggested that in future only exhibits entered for competition will be received thus reducing unnecessary work and expense and affording the public a chance of getting only the high quality baskets and other exhibits shown. This would also prevent the loss of a good number of the exhibits which happens every year.

Village Industries.

Section Chairman. Captain L. D. Gammans, M.C.S.

Hon. Section Secretary. Inche Patek Akhir.

The competitive section was organised on lines similar to those of past years and was one of the most interesting in the Exhibition. The exhibits were of all kinds, basketry, metal work including silver and brass ware, miscellaneous articles such as artificial flowers, lamp shades, walking sticks and models. In the last class an extremely well made model of a ship was exhibited and won the gold medal presented by the Hon'ble Mr. T. S. Adams, the British Resident, Selangor.

Art and Photography.

Hon. Section Secretary. Mrs. R. A. Barbour.

This section steadily increases year by year and considerably more space was allotted than hitherto. Even so, additional screens had to be erected at the last moment to accomodate exhibits and the result was quite a miniature academy. Prizes were by no means monopolised by European competitors and a particularly fine head in oils by Mr. Ju-Chi Tchang of Singapore won the first prize in its class.

Exhibits in the photographic section were numerous and all of such an exceptionally high standard that one's sympathies were with the judges in the difficult task that faced them.

Mention must also be made of an extremely able clay bust of a Tamil woman modelled by Mr. N. J. Godamanna of Kuala Lumpur which was awarded a special prize.

Pig Section.

Section Chairman. Mr. V. L. Cachemaille.

The total number of animals that came forward for Exhibition was larger than in previous years, and in fact constituted a record. The number of grown animals shown was 33 and in addition there were six litters (a total of 56 piglings) accompanying their dams. This support given to the section was all the more satisfactory when it is remembered that the Government Experimental Plantations, Serdang, only filled two pens this year as compared with the larger number of animals sent to former Shows.

The pure bred classes did not attract a large entry—possibly partly owing to the slump there are fewer animals of the type in Selangor and adjacent States available—and those that were shown for competition were not quite up to the standard of past years. But if this is so the balance was made up by the increased number and improved quality of the cross bred classes which formed the bulk of the exhibits, and among these were several fine animals.

The native classes were much on an equality with previous recent years and were neither representative nor numerous. The four specimens shown in the three classes all came from the same kampong and in no way represented the variety of type and the good points quite often seen in Selangor kampongs and at the Abattoirs. It is true that the vast majority of the pigs in native hands leave much to be desired both in type and in softness of bone and of fat, but it is exceedingly difficult to induce the owners, particularly in these difficult times when even kampong pig keeping is in most cases hardly a paying proposition, to put forward for exhibition a few selected animals. Perhaps the main reason why the native classes were on the whole a poorer lot than usual was the absence from duty owing to sickness of the Chinese Sub-Inspector of stock whose assistance in past years has been valuable.

The most interesting exhibit in the native classes was a young tame wild gilt which had been brought up under domestic conditions from a very small age. Unfortunately the journey by car to the Show and the noise and strange conditions on arrival excited it and it was not long before it escaped, clearing with ease the 5ft., wall of the pen, being able to jump like a deer. The well-formed bone and firm flesh of an animal given a large degree of free range thereby enabling it to balance its own ration was a most interesting contrast to the wholly sty-fed animals. She attracted much attention as long as she remained in her pen.

Turning back to the pure bred classes to look at them in rather more detail, it was noticed that the three boars shown were all Middle Whites and all had their origin in the Government herd at Serdang, and therefore were similar in type. They were all somewhat heavy in the shoulders and tall in the leg, and though none were as large as some animals seen at previous Shows they were marked for their docility and friendliness when walked round the ring in the presence of and among the public.

Only one pure bred sow—again a Middle White and from the Serdang herd—was shown. She took a well deserved prize as she did on her former appearance on the Show ground.

A fact much to be regretted was that no stock came forward for exhibition and competition in the pure bred classes for sows with litters and for gilts, a fact that accentuates the extreme scarcity of pure stock in these parts at the present time. A large black sow with a fine litter of eight piglings was shown from the Serdang herd and was the only entry in these two classes. She was not for competition.

All the three cross-bred boars shown were from a Middle White sire and a native dam, and were exhibited by Chinese owners from the Kampongs, and represented the results of the sale to native owners of good stock from the Government herd at Serdang and from a privately owned farm. Everyone who has seen the usual miserable little kampong boar being led along the roadside on a string or even carried in a basket on the back of a push bicycle will appreciate what an immense advance in pig breeding the use of such animals as these three exhibits represents: an interesting demonstration that a sound policy is bearing fruit.

The cross bred sows class received the largest individual number of entries and included two fine animals exhibited by the Central Mental

Hospital, Tanjong Rambutan, one of which, a Poland China native cross, deservedly took a prize. Five out of the seven exhibits in this class were Middle White native crosses, again indicating the present preponderence of the Middle White over other introduced breeds in the district.

As already mentioned five cross-bred sows accompanied by their litters were the most popular exhibits in the section. Two were Mid White—native crosses, with litters of 12 and 9 piglings; two were Berkshire—Native with litters of 10 and 9, and a Large Black—native with a litter of 8, and all, including the dams were in excellent condition.

Under the cross breds this year a new class was added to admit Butchers' Class animals and received three entries comprising seven exhibits. Six of them, all Mid White crosses, came from Chinese kampongs and were greatly superior to the type of animal commonly seen in the kampongs fattening for the local market. They were not over fat with fat of a flabby quality as is so often the case with the native fed pig and were in firm condition, showing good bone with straight backs and upright fetlocks.

The judging this year was in the capable hands of Mr. T. D. Marsh, N.P.A., Assistant Agriculturist at the Government Experimental Plantations, Serdang, whose knowledge of pigs and sympathetic understanding of the local conditions in the industry enabled him to carry out his somewhat difficult duties with satisfaction to all parties. Thanks are due to him for his services, and to the Agricultural Department for sending forward a selection of their stock for Exhibition.

It may safely be said that the past Show demonstrated that further progress has been made in the improvement, at least in these parts of the F.M.S., in the standard of pigs among the native breeders and farmers. It may be that only a very small proportion of pig keepers have so far acquired improved strains but many more actual and potential pig keepers have seen what can be done by crossing the imported strains with the native sows and with any general improvement in economic conditions and the resumption of pig farming on the scale of former more flourishing times will come a rapid increase in numbers of the better type of stock. There is no doubt that the Middle White breed crossed with the native has found favour among the Chinese growers and butchers, and the development of this strain will go ahead when conditions permit.

Trade Section.

A sign that Malaya is regaining the road to prosperity was to be found in the increased number of stalls in the Trade Section and in reply to enquiries made during the Exhibition all exhibitors expressed themselves as being extremely satisfied with results. A motor car was sold by Messrs. Borneo Motors Ltd., five minutes before the official opening and numerous enquiries have subsequently resulted in business, one car having being sold in Ipoh as a direct result of the Show. Messrs. Harrisons, Barker & Co. reported the sale of two engines of considerable size and several other sales were made by other business houses, while the number of enquiries received was particularly encouraging.

The Gold Medal awarded for the best stall was won by Messrs. Imperial Chemical Industries Ltd., whose stall was very evidently the result of careful thought and design, and they were closely followed by Messrs. The Asiatic Petroleum Co., Ltd., whose stall, strikingly decorated with the well known Shell pumps was awarded the second prize of a silver medal.

Numerous other medals were awarded for display and quality of exhibits.

Village Industries.

In addition to the competitive classes already described, this section, which covered a large area in the main building, included stalls erected for the special display of state handicrafts.

For the first time, Selangor had a separate stall ably organised by the Tungku Laxamana who is doing a great deal to develop kampong industries. The stall was very effectively decorated and did a roaring business, it being distinctly unsafe to pass within five yards of the enthusiastic helpers!

Their enthusiasm culminated with the award of a silver medal for the first prize in this section.

The Kelantan stall was awarded the second prize, a bronze medal, and here again business was very brisk, their sales actually far exceeding those of the Selangor stall. Three ladies had travelled down from Kelantan to manage this stall and they must have been extremely satisfied with the result of their labours.

A small stall accomodated Brunei silver and sales made by an old Malay in charge were very satisfactory.

Port Dickson had their usual stall in which Malay women worked at bag making and a constant crowd indicated that business was brisk.

The Sultan Idris Training College had a large stall, the main feature of which was a demonstration of cotton printing, sarongs being printed in several different styles with dyes of excellent fastness. The work was shown in all stages from the preparation of the design, cutting of the blocks, to the printing and developing of the pattern. Sarongs made by the students of the college were on sale, and in addition work in other crafts was also exhibited, consisting principally of basketry and pottery, was batik and stencilling.

The Kuala Pilah English School exhibited two working looms which had been made locally and a large crowd collected each time these looms were operated by the Malay girls in charge.

The Batu Road, Pasar Road and Maxwell Road Schools all had stalls displaying the work of scholars, the Batu Road School having a working model of a potter's wheel which created considerable interest.

Government Departments.

In the main building the F.M.S. Railways had their Information Kiosk installed. The Drainage and Irrigation Department and the Posts and Telegraph Department were also represented, the former showing a working model of an extension of the Krian irrigation system.

The Posts and Telegraphs Department.

The comprehensive exhibit staged by the Posts and Telegraphs Department was extremely interesting and demonstrated in a small way, the latest practice in automatic telephone switching and machine telegraphy.

In the centre of the stand there was a working model of an automatic exchange, to which were connected several automatic telephones by using one of which it was possible to watch the progress of a call through the various switches on the unit.

A form of switching unit for secretive party line telephone working, which has been developed and constructed locally, was also exhibited. This unit is intended for people from rural areas as it is one of the means developed by the Department to cater for subscribers, where, owing to the scattered nature of mines or plantations, it would not be possible to get a sufficient number of subscribers to warrant the expense of running a manual exchange. The unit takes the place of a manual exchange and switches subscribers connected to it to a central exchange where their calls are dealt with in the ordinary way.

Printing telegraph machines known as "Teleprinters" were shown fitted with a typewriter keyboard which can be operated by any typist. These machines are of interest to business houses in Malaya, in that they can be used in conjunction with the ordinary telephone service. As an example of this a Company having an office in Kuala Lumpur with a Branch Office in another part of the country, if equipped with Teleprinters could pass a telephone call in the ordinary way and by arrangement with the distant station use the connection for teleprinter telegraphy, or telephone as desired.

The chief advantage of such a service is that a written record of messages is available at both offices, and even if there is no one in attendance at the distant office messages are printed by the teleprinter and are available as soon as some one arrives to deal with them.

Another interesting exhibit was a Cathode Ray Oscillograph, a device for indicating the wave form of alternating currents by which the wave form of the voice can be seen.

The Co-operative Societies Department.

The Co-operative Societies Department staged an interesting exhibit in the Poultry Section illustrating the work of the Co-operative Egg Marketing Society which operates under its auspices in Krian. A demonstration was given of methods of grading and testing eggs by means of "candling".

This Department also gave free displays each night of educational cinema films in conjunction with the Public Health Department in a specially constructed building.

Selangor Medical and Health Department.

The Medical and Health Department, Selangor, have their own building in the Exhibition grounds. A comprehensive range of exhibits, including Infant Welfare, General Hygiene and Sanitation, Malaria Prevention, Control and Treatment and Social and Dental Hygiene, served to adequately demonstrate modern methods of preventive medicine. Explanatory cards in the various languages were attached to each exhibit.

INFANT WELFARE SECTION.

In this section, models, pictures and posters on maternity, infant and child welfare—ante-natal and post natal, were shown. Feeding and the preservation of food, dress and infant and maternity hygiene were amply exhibited.

Practical demonstration—lectures were given during the Exhibition each morning and afternoon.

ANTI-MALARIAL SECTION.

This section included four large working models illustrating anti-malarial control in all its branches and two films were also exhibited at intervals, showing new methods of oiling which are now in use in Kuala Lumpur and general measures of mosquito control.

Another interesting model showed control by Paris Green. There were numerous posters, diagrams and exhibits dealing with malarial control in all its branches.

GENERAL HYGIENE AND SANITATION.

Methods of control in the commoner diseases were indicated and models and diagrams showing village sanitation, protection of estate water supplies, clean food (particularly milk) production and conservancy and refuse disposal were exhibited.

SOCIAL AND DENTAL HYGIENE was illustrated by lantern slides, models and charts.

As in previous years, much public interest was manifested and there is little doubt that the Exhibition furnishes each year an excellent opportunity to further public health propaganda.

Rubber Research Institute Exhibits.

Exhibits from the Rubber Research Institute were staged by the Chemical, Pathological and Soils Divisions. The publications of the Institute were also on sale.

Chemical Division Exhibits.

The general object of the exhibits from the Chemical Division was to create interest in the uses of latex and to provide information for producers in regard to treatment of latex for export.

The main stand consisted of an octagonal pyramid one side of which was devoted to special samples of sheet, crepe, blanket and compo grades.

LATEX.

One section was devoted to specimens showing the preservation and concentration of latex illustrating particularly centrifugal treatment of latex in order to remove constituents which cause discoloration of the latex during storage. Concentration of latex by creaming agents was shown in a glass vessel, in which the separation was in progress. A locally made barrel of local wood which is being tried as a latex container for export was exhibited. Samples of the various types of concentrated latex on the market were also exhibited.

LATEX CONSTITUENTS.

Another section was devoted to various non-caoutchouc constituents of latex—e.g., quebrachitol, lipin, proteins and phosphates, which influence the character and qualities of latex and rubber prepared therefrom.

The method of preparation of quebrachitol was illustrated by means of a flow diagram and samples of the various intermediate partially purified products.

NEW USES FOR RUBBER (Latex Products.)

The largest section which attracted most attention was devoted to manufactured rubber articles including principally a range of products manufactured direct from latex, many of which represented applications to new uses.

The most popular of such exhibits were the "Dunlopillo" sponge rubber bus cushions and the "Lastex" round rubber thread and bathing costumes containing this thread. One set of the cushions was covered with cretonne and mounted on a wooden seat so that visitors could test the comfort of this new type of seating, already being adopted extensively in buses in Great Britain. Attractive coloured rubber sponges made direct from concentrated latex were also shown.

RUBBER PLASTICS.

One other very recent application of rubber to new uses which was exhibited was the new "Plioform" powder and two articles moulded from this product which should constitute a new competitor in the plastics field, if the price is favourable.

RUBBER FIRELIGHTERS.

Several types of firelighters composed entirely of raw rubber or containing raw rubber mixed with other ingredients were also exhibited.

RUBBER ROADWAYS.

A footpath prepared from the rubber roadway product developed at the Institute was laid in the main exhibition building.

Pathological Division Exhibits.

LEAF DISEASE *(Oidium Heveae).*

In view of the prominence given to an outbreak of this disease in certain districts early in the year, graphs, charts and a map were exhibited to illustrate the distribution of the disease in Malaya.

These charts and graphs and map demonstrated (1) that old rubber trees suffered more severely than young trees (2) a light attack occurred on a number of estates while heavy infection occurred only on a few estates (3) the incidence of the disease was greater on trees growing on sandy soil than on clay soil; fewer cases occurred on estates with peat soils while trees on loam soil showed infections intermediate between peat and clay soils. (4) few reports of infection were received from districts which were very dry in February (0.33—2.9 ins. of rain) or from very wet districts (8—13 ins. of rain); the greatest number of infections were from districts having a rainfall of 3—6 inches in February and early March. (5) the attack was short but intensive from about the first week in March to the second week in April.

In certain districts the question of control measures has arisen. Treatment with liquid sprays is impracticable and requires large supplies of water in the field. Dusting with fungicides in powder form, which is becoming increasingly popular for the treatment of certain plant diseases, is considered to be the most satisfactory method of combatting the disease.

Fine sulphur dust has proved to be an excellent fungicide for use against leaf mildew disease, when applied at the rate of 5—7 lbs. per acre at intervals of 7—10 days during refoliation after wintering. Several types of dusting machines have been evolved. Three of these—the Bjorklund, the Holder Sulphia III and the Dustejecta were exhibited.

Photographs illustrating the dusters in action and showing the formation of a cloud of sulphur dust reaching a height of over 100 ft. were exhibited.

Types of hand dusting machines for rubber nurseries and market gardens were also shown.

A table was prepared giving details of cost of dusting computed on the basis of maximum economic capacity of any one of the three dusting machines exhibited. It is estimated that 2,000 acres can be dusted five times at intervals of 7 days during the season with one of these machines.

The estimated costs, which may vary slightly with local prices of material and labour, lie of land and unsuitable weather, are as follows:—

Petrol (100 gallons) @ 78 cts. per gal.	$ 78.00
Lubricating oil (10 galls.) @ $2/45 per gal. ..	24.50
Labour (12 coolies) for 36 days @ 40 cts.	172.80
European supervision	125.00
Depreciation on machine (33% of original cost) ..	250.00
Total ..	$650.30

Rate per single dusting .. .. .. 6.5 cts. per acre.

Total cost of treatment = 6.5 times the number of dustings plus cost of sulphur per acre.

e.g. Five dustings with 7 lbs. of Flotate sulphur per acre per dusting

= 6.5 × 5 + 7 × 5 × 4 (sulphur = 4 cts. per lb.)

= 32.5 + 140 cts.

= $1.73 per acre.

ROOT DISEASES.

In order that the root disease exhibit should reflect the most recent point of view in relation to root diseases of the rubber tree, caused by the two fungi, *Fomes lignosus* and *Ganoderma pseudoferreum*, as a result of researches carried out at the Institute, a new method of presentation was adopted.

Formerly, before the close affinity of these two diseases was suspected, each disease was presented as a separate entity, each exhibit illustrating the more striking features or differences.

In the light of recent discoveries, this method was considered unsatisfactory, since it focussed attention on contrasts instead of on similarities and thus obscured the main purpose of an exposition of these root diseases, which is to emphasize the following fundamental facts:— (a) the strong family relationship between the diseases in relation to their origin, development and propagation, which enable them to be treated collectively: (b) the practical problems in the field are variants of a general problem and not a medley of unrelated problems.

The method adopted to illustrate these facts were (1) the construction of the exhibits round the general history of the origin, development and propagation to which each disease conforms: (ii) the incorporation of all the diseases in one exhibit to display them in "parallel" instead of in "series" as in the past: (iii) the exclusion of abnormal specimens which might distract attention from the main thesis.

The exhibits consisted of a central placard in which the general story of root diseases was described in its theoretical and practical aspects. This was supplemented with specimens illustrating the characters of infected jungle timber (as the source of infection), the rhizomorph system (as the vehicle of infection), the wood of infected rubber trees and fructifications and artificial cultures on sterilized wood blocks.

DRY ROOT ROT *(Ustulina Zonata).*

An exhibit was also shown of the collar and root infection of rubber trees caused by the fungus *Ustulina Zonata.*

The object of a separate presentation of this disease was to demonstrate the fallacy that this disease may be placed in the same category as the "true root diseases" dealt with in the main exhibit and to emphazise how each type of root infection originates, develops and is propagated.

This disease is caused by a wound parasite propagated by wind-borne spores and failure to realize this has given rise directly to heavy losses of mature trees through infection by "Dry Root Rot" or "Collar Rot." These arise when pads of earth scrap rubber are allowed to collect at the base of the tree and produce an incipient bark wound which is susceptible to attack by this fungus.

LIGHTNING DAMAGE.

This exhibit, which consisted of an annotated plan and large photographs, illustrated the features of a typical lightning strike in a young plantation. Only recently have certain losses and damage been correctly diagnosed as due to lightning. The sudden rapid dying back of trees over restricted areas was formerly attributed to the Die-back fungus *(Botryodiplodia theobromae)* the fructifications of which appear on the bark of injured trees.

This fungus is however rarely a parasite, although it is one of the early secondary organisms which attack weakened tissues.

Soils Division Exhibit.

The exhibit staged by the Soils Division consisted of the following:—

(i) A diagram illustrating the general principles underlying the nutrition of the rubber tree and explanatory matter showing the ill effects of soil erosion and the ameliorative effect of a natural undergrowth.

(ii) Specimens of indigenous wild plants which occur as natural covers on rubber estates, with a list of names, together with an album of photographs of many of these plants.

(iii) Typical soil monoliths, with analytical tables, illustrating the chief morphological features of Malayan soils, including hill type, peaty type and coastal clay type.

Department of Agriculture.

In the Department of Agriculture section of the Exhibition building, which is shared with the Rubber Research Institute, the exhibits this year were staged on ten separate stands and were designed to demonstrate recent advances in agricultural methods and research work.

The first of the two central stands was occupied by an exhibit to illustrate a method of manufacturing first class kiln-dried copra. It consisted of a model of a faulty type of kiln such as is commonly found in kampongs and two other models, of clay and brick kilns, of an improved type suitable for small holders, together with samples of good and badly-cured copra. The whole was very effectively displayed.

On the other central stand were grouped exhibits of lowland tea, tobacco, bleached palm-oil, and a new method of vegetative propagation.

The lowland tea consisted of exhibits of all grades of tea made at the Government Experimental Plantations, Serdang, displayed both in loose form and in packets as sold in Malaya.

The tobacco was the Virginian type, flue cured leaves from both the Serdang Plantations and the Singapore Pineapple Station being exhibited with cut tobacco and cigarettes prepared from each. Cheroots prepared from the Serdang leaves were also displayed.

The refined palm oil exhibit showed palm-oil at various stages of the refining process—(a) crude oil, (b) bleached oil, and (c) bleached and neutralised oil. Two different methods had been used for bleaching the oil; in the first case hot-air treatment, in the second the same treatment but with the addition of a catalyst which enables the oil to be bleached at a lower temperature.

The vegetative propagation exhibit was an illustration of the etiolation method employed successfully in England at the East Malling Fruit Station. Plants of tea from the field were shown which had been collar pruned six months previously. Each plant had produced about ten shoots which, after mounding and wiring, developed an abundance of roots. Young plants, being the severed shoots, were shown with their roots in water to display the satisfactory root system which had been induced to develop.

One of the side stands was devoted to dairying and demonstrated some of the activities of the Department of Agriculture at the Stock Farm, Serdang, and Jeriau Farm, Fraser's Hill. Models illustrating dairying technique, and a model of the modern type of byre used at both Serdang and Fraser's Hill were exhibited. Charts of bacterial counts made by the Health Department illustrated the purity of the milk retailed from both places, and photographs of some of the pure-bred Friesian and Montgomery cattle and the different types resulting from crosses between them were also shown.

The other four stands on the same side of the building as the dairying exhibit were occupied respectively by demonstrations of the recent results obtained from experiments in the manuring of oil-palms, pineapples, padi and fodder grasses.

On the opposite side, one stand dealt with marketing problems and showed the value of improved methods of preparation and grading in relation to copra, pineapples and copra. Samples of small-holders' copra from various parts of the Federated Malay States prepared on kilns of the improved type advocated by the Department were contrasted with average samples, and tabulated statements illustrated the profit gained by the small-holder by preparing his own copra as compared with selling his nuts, and the greater profit obtained from good copra as prepared on the improved type of kiln.

Specimens of tinned pineapples were shown for comparison with the ungraded product now exported; and samples of coffee beans demonstrated the recent progress that has been made in the production and grading of coffee beans in the Kuala Langat District of Selangor.

On another stand, samples of the grades of tea produced at Tanah Rata Experiment Station, Cameron Highlands, were displayed, with charts showing the comparison between the valuations by brokers and the average price ruling at the same time for Indian, Ceylon, Java, Sumatra and Nyasaland teas.

The School of Agriculture at Serdang also had a stand where panoramic photographs of the School and its surroundings were hung and a film depicting the School and the life and work of the students was shown at regular intervals each day.

The various publications of the Department, including the *Malayan Agricultural Journal*, were also prominently displayed and advertised for sale and distribution.

Professor K. B. Williamson.

Professor Williamson staged an interesting anti-malarial exhibit with working models and photographs of his sluice gate method of control.

The Y. W. C. A. and Y M. C. A.

Both the Y.W.C.A. and the Y.M.C.A. organised rest rooms in the exhibition grounds, and in the case of the former a conservative estimate of attendances put the total at 300, which proved how much such a retreat was appreciated and necessary.

Catering and Amusements.

A large and spacious attap building housed the principal restaurant, catering arrangements being in the hands of the Majestic Hotel who are to be congratulated on the way in which they coped with the large crowds, particularly on the Saturday night when a special dinner and cabaret were given. The cabaret performance was repeated on Sunday and Monday and tea dances were also given, though these met with little support.

Messrs. Wong Kee were the Chinese caterers and Mohammedan and Muslim restaurants were also available.

The boys of the Kuala Pilah English School staged two Malay wayangs, "The Magic Flute" which they had themselves translated into Malay and "Pa' Belalang." Two performances were given daily but the attendances were disappointingly small and very discouraging to the boys.

The newly formed Selangor Amateur Athletic Association held its first meeting in the Stadium on the first and second days of the Exhibition, while at night a free cinema also in the Stadium drew large crowds.

Numerous game stalls and side shows were in evidence and appeared to be well patronised.

Traffic and the A. A. M.

This report would be incomplete without tribute being paid to the excellence of the traffic and parking arrangements due to the hard work of the Police Traffic Department who were assisted by the Automobile Association of Malaya. Great help was also rendered in this direction by the Boy Scouts Association, companies of Boy Scouts being on duty throughout the Exhibition engaged both on traffic and miscellaneous duty.

Horticulture.

ORNAMENTAL TREES OF MALAYA (*continued.*)

BY

R. E. HOLTTUM, M.A., F.L.S.
Director of Gardens, S.S.

The Bignonia Family.

This is a large tropical family, more abundant in the New World than the Old, containing many ornamental plants. The flowers are usually large, cup- or bell-shaped, and brightly coloured. A large number of the species are woody climbers or lianes, but a few are trees. In the native Malayan flora are only 10 species, of which 9 are trees; none of these are of special ornamental value, but one of them, *Dolichandrone* (Kulok), is sometimes planted in the north by roadsides (there are also a few trees in Johore Bahru). A number of climbers of the genera *Bignonia* and *Tecoma* have been introduced into Malaya, but some of them do not flower very freely, owing to our uniform climate. Among introduced trees, *Spathodea* and *Jacaranda* are the only two of importance. The African "sausage tree," *Kigelia*, is of rare occurence in gardens, and the calabash is sometimes planted, especially in the north.

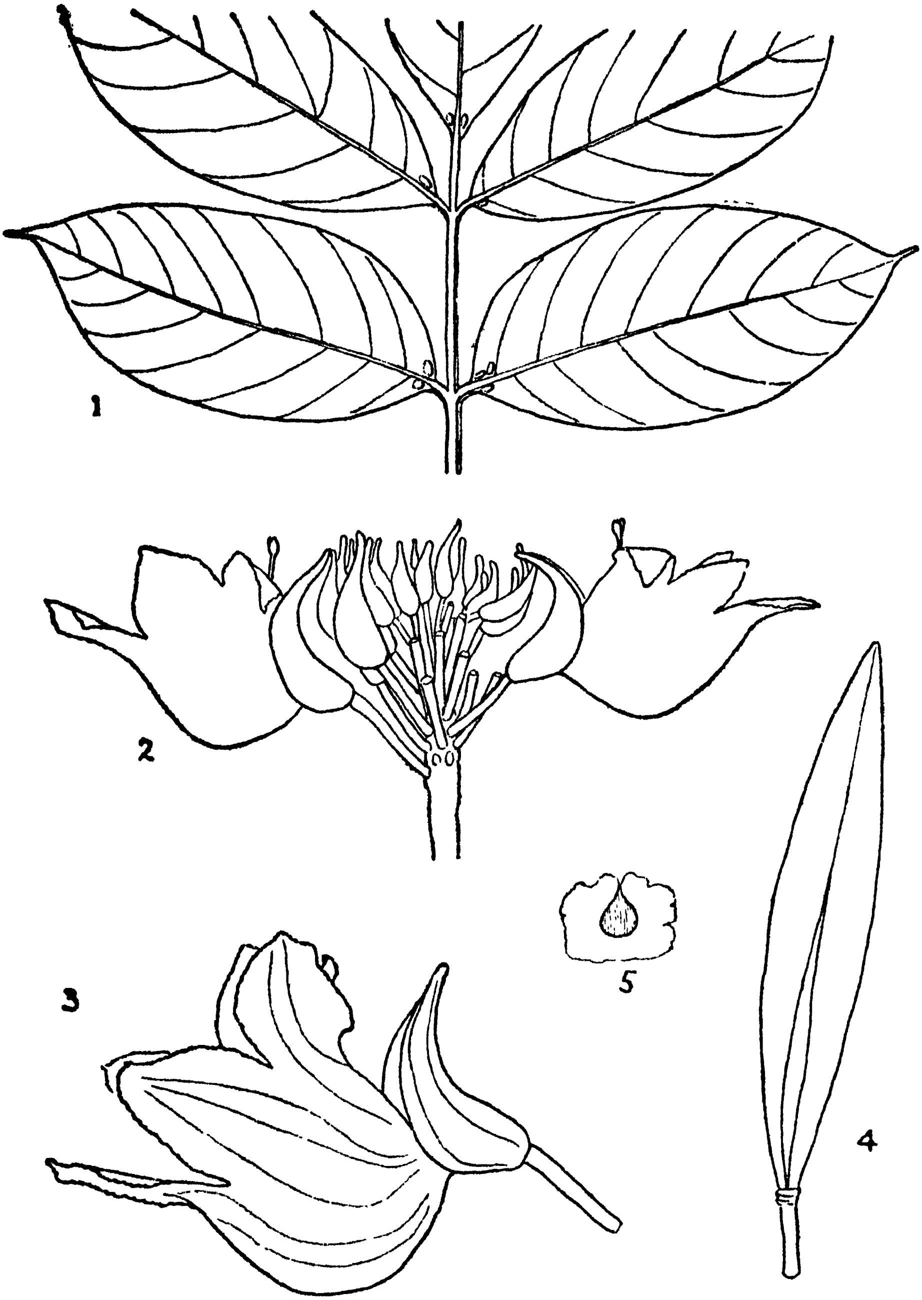
Plants of this family have opposite leaves, usually compound; the flowers are usually large, the calyx cup-shaped, the corolla more or less bell-shaped with 4 stamens attached to it; the fruit is a more or less flattened pod-like structure which breaks open along two sides and liberates the seeds, which are very thin and winged.

Spathodea campanulata.

Malay name: *Panchot*. African Tulip tree. Distribution: Tropical Africa.

This is usually a tall tree when full grown, but quite young trees may bear flowers. Full grown trees reach 70 or 80 feet in height, and have fairly dense moderately spreading crowns; the branches are conspicuous owing to their pale bark. The trunk is erect and straight, somewhat buttressed at the base; the bark is pale and very thin, with a thick white pulpy tissue beneath it.

The leaves are opposite, pinnate, 6 to 18 inches long; the leaflets are usually 11 to 13 in number, shortly stalked, long-ovate with a narrowed acute tip, 2 to 4 inches long by 1 to 2 inches wide, usually shortly hairy on the veins on both surfaces. The flowers are borne in dense groups on stout erect stalks, the buds in the middle surrounded by the expanded flowers. The buds are brown and velvety, and contain water; if the tip is broken the water may be squirted out (whence the name *panchot*). The calyx of the opened flower is split almost to the base on one side and curved over strongly in the opposite direction, with a beaked tip; it is 1½ to 2½ inches long. The brilliant orange-red corolla is deeply cup-shaped with five broad lobes at the rim; the edges of the lobes are crinkled and bright yellow-orange in colour.



Sapathodea campanulata. 1, part of leaf; at the base of each leaflet are sugar-secreting glands. 2, inflorescence, showing the numerous flower buds. 3, a single flower. 4, a fruit, splitting open down the middle of one side. 5, a seed; the unshaded part is the very thin wing. 1 & 3, half natural size. 2 & 4, one third natural size. 5, natural size.

The fruit is erect, woody, 6 to 8 inches long, 1½ inches wide, flattened, splitting open and liberating very numerous thin seeds, each with a pale papery wing about an inch long.

This is a very fast-growing tree, and on account of its fine flowers is much used for ornamental purposes. It is evergreen and flowers throughout the year in Malaya. Its disadvantages are that it seems often to die back at a relatively early age, the dead branches being unsightly and spoiling the shape of the crown; also, being soft-wooded, large trees may be dangerous. On the other hand, well grown trees may be safely pruned, and will shoot again quite profusely. For the above reasons, it is not a really good avenue tree, though it is often combined successfully with other species. Where fairly large quick growing trees are required for screening it is very useful, as it has a good growth of foliage over a considerable range of height. For really good growth it requires a rather rich well-drained soil. In Malaya it rarely fruits, though in Java all the trees fruit freely. On Penang Hill the trees grow less tall than in the lowlands, and flower most profusely and brilliantly. It might be tried with advantage at other hill stations.

The African tulip tree may be grown from seeds, if obtainable; or failing seeds, from root suckers. Root suckers are freely produced by many trees, especially if the roots are damaged. When the sucker is 18 inches or so high it has developed roots of its own and may be served from the parent root and transplanted.

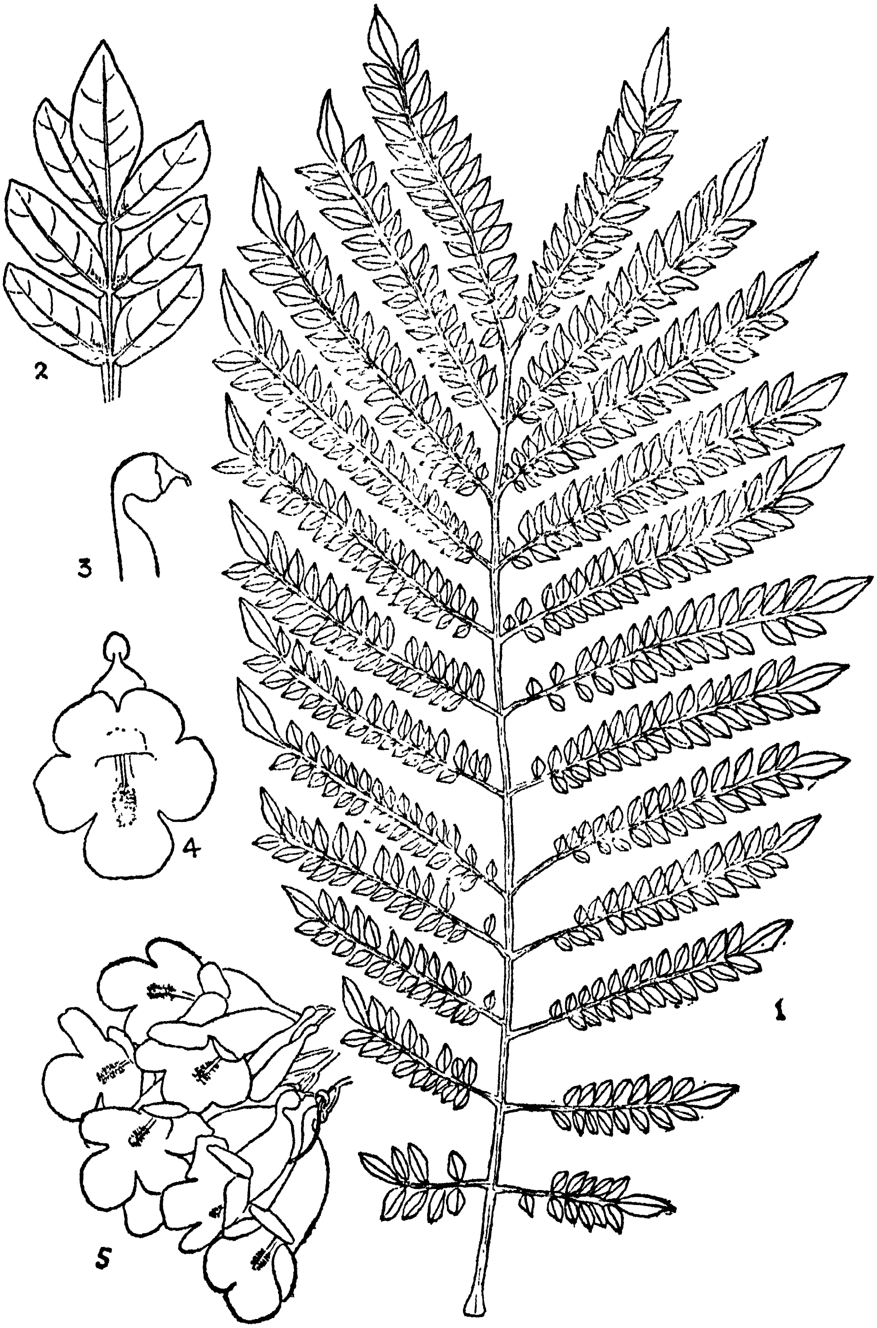
Jacaranda filicifolia.

(no Malay or English names). Distribution: South America.

A small tree with finely divided foliage, attaining about 30 feet in height; when well grown it has a shapely compact bushy crown, sometimes leafy almost to the ground. The name *filicifolia* refers to the fern-like nature of the leaves. *Jacaranda* is said to be the Brazilian name for the tree.

The leaves are opposite, bipinnate, the stalks 1 to 2 inches long, the pinnae (branches of the leaves) 10 to 20 pairs, each shortly stalked and with 10 to 20 pairs of leaflets; the leaflets unstalked, small, barely ½ inch long, pointed at both ends and unequal at the base, with a tuft of hairs on the midrib just above the base on the lower surface. The inflorescences are borne on the old wood, after leaf-fall and before the new leaves appear. They are dense, and bear a succession of beautiful lilac-coloured flowers. The calyx is very small, cup-shaped. The corolla is narrowly tubular and curved at the base, tubular and somewhat flattened in the middle, spreading into five rounded lobes at the mouth. It is about 1½ inches long, pale violet-coloured with a white patch on the upper side of the throat and some short darker hairs on the lowest lobe. The fruit is flat, 1½ to 2½ inches long, 1 inch wide, containing flat thinly winged seeds.

This is one of the most beautiful among our smaller trees. Unfortunately the Malayan climate is too uniform for it, and it is usually irregular in flowering; many trees flower only on one branch at a time. If the trees



Jacaranda mimosaefolia: 1, complete leaf; 2, under-side of small portion of leaf; 3, base of flower, showing small calyx; 4, a single flower, front view showing hairy stigma; 5, a group of flowers. 1 & 4, ½ natural size.

have a regular dry season, the leaves turn yellow and fall, flowers appearing on the bare branches before the new leaves. It appears that some individuals are more sensitive to a dry season than others.

The Jacaranda likes a good well-drained soil and a sunny situation. It is hardly big enough for avenue planting, but very useful for gardens, where its small size is an advantage. Young trees grow rapidly, often becoming very tall before branching. In such cases it is well to top them. There is a tendency for the trees to become straggly, and judicious pruning may be needed to keep them in a good shape. It will usually be found that unsatisfactory soil conditions are chiefly responsible for poor growth, and many unsightly trees are due to this cause rather than to climatic conditions.

This species is propagated from seeds, which are freely produced.

Single Tuberous Begonia
Grown in Singapore.

NOTES

ON

ENGLISH TUBEROUS BEGONIAS

BY

P. C. B. NEWINGTON, SINGAPORE.

The tubers arrived from Carter's, England, on May 4th, 1933, in a soldered tin, packed in shavings in paper bags. The solder, however, had opened up in one or two places, admitting air.

Tubers were in good condition, dry and all having 2-3 pink shoots showing, about 1″ in length.

Soil.

This was sterilised by boiling and consisted of 2/3 light friable soil, 1/3 sand and 2 catties charcoal, the mixture being enough to fill five 10″ pots. Pots were well drained.

Method of Planting.

Tubers were planted with top of bulb level with soil and when leaves appeared the tubers were pushed down a little deeper and a light layer of earth worked over top of bulb. Leaves formed rapidly and buds appeared a month after.

Position.

The pots were placed on wall of covered porch where they got early morning sun till about 8 a.m. and a continuous draught.

The growth of the plants is recorded in the table on the following page.

Observations.

Curling of leaves and damp rot of leaves and stalks supervened.

The rotting of leaves was most apparent where leaves touched edge of pots. It very seldom occurred on other leaves, and where it did, it seemed to be due to some mechanical injury, such as moving leaves aside with one's hands to view buds beneath.

The double Begonias apparently throw up a long stalk bearing two buds and sometimes three—one big, a double bloom, and the others single.

In all cases the double bloom bud, after attaining the size of a dollar, fell off before opening. The single flowers remained, bloomed and seeded. The single blooms lasted 8-9 days.

It seems that the plants, in this climate, have not strength enough to carry the double blossoms to maturity.

STATISTICS.

Date.	Single Pink 3 tubers.	Double Rose 3 tubers.	Single Bronze Yellow 3 tubers.	Single Scarlet 3 tubers.	Double Yellow 3 tubers.
1933 July 12th.	(a) Three sprays of buds. One bud far advanced and beginning to open - fell off and was found to be slightly brown at base of outermost petal. No sign of shrivelling of stalk, so suspect accidental injury.	(a) Six sprays of flowers. not quite opened. Leaves curling and one leaf damp-rot. Plant strong.			
	(b) Rotted off	(b) This tuber was started in coconut fibre and water in a bowl. Growth very slow. (a) had attained twice the size in the same period so I transferred this tuber (b) to same pot as (a). It is now a vigorous plant, not quite as forward as (a), flower growth correspondingly retarded but foliage much darker	All plants doing well and showing buds in various stages.	One plant in flower. 2 fine blooms Other two in bud All plants strong.	Plants strong and in various stages of bud.
	(c) Rotted	(c) Rotted			
July 20th.		Double flower fell off before opening. leaving smaller single flowers which bloomed and seeded A good show.			Large double flowers fell off before opening. leaving smaller double flowers which bloomed.
August 12th.			These plants seem to experience difficulty in producing mature flowers. Petals drop off when flower half open.	These plants bloomed well producing flowers 3″ across and numerous smaller flowers. To-day buds, half-opened flowers, and leaves started falling off. Looks like the finish of these plants Main stem getting weak.	
August 13th.	Transferred all plants out into the open in shaded position Rot of leaves and stems greatly advanced. Plants look fine and strong in early morning after night dew but leaves and branches shed increasingly.				

GARDEN PLANNING IN MALAYA *(contd.)*

BY

F. FLIPPANCE, F.R.H.S.
Assistant Curator, Botanic Gardens, Penang.

The plan shown in Fig. IV suggests a simple lay-out for a garden of the oblong type in which the drive is situated near to one of the lateral boundaries. The proportion between size of house and garden is well balanced and the house has a north aspect. This type of garden is fairly common in this country and the plan suggested could usefully serve for any area from a quarter to three quarters of an acre, provided the measurements for beds, etc., were proportionate modified. The garage has been placed on the west side (the "hot" side) and the garage road is merely a continuation of the main drive. This is the most probable position for these roads and is obviously the most economical. It has the further advantage of securing complete privacy on the east side (the "cool" side) of the house and this in itself is sufficient reason for such an arrangement. With such a groundwork it is possible to produce a more informal type of lay-out, but the difficulties presented by the long straight road from entrance to garage must not be underrated. For description purposes it is again necessary to deal with the plan in sections. They are as follows:—

Sections.

BOUNDARIES—These will probably consist of hedges which will enclose the whole area. An additional hedge is inserted at the line of the rear wall of the house.

LAWN SECTION—This consists of the large grass area bounded by the drive and the front and east boundary hedges up to the front line of the house.

HOUSE SECTION—This consists of:—

(i) the small area on the east side of the house.

(ii) the small area on the west side between the house and drive.

DRIVE SECTION—This is the narrow strip between the drive and the west boundary hedge.

Explanation of Lay-out.

BOUNDARIES—The hedges form an unbroken line around the area save at the entrance. This ensures privacy and every endeavour should be made to keep these hedges in good order. The additional hedge should receive similar treatment, as it completely shuts off the back quarters from the house and garden.

LAWN SECTION—This comprises by far the largest part of the garden and the ultimate result must depend on the manner in which this area is treated.

Beginning from the road boundary the lay-out is as follows:—

Borders 1, 2, 3—These are made irregular so that they present undulating lines when viewed from the house in order to give an idea of greater space.

Beds 4, 5, 6—These are to provide connecting links between the informality of the borders and the formal lines of the drive and house.

Tree 7—A small flowering tree at this point adds to the informal nature of this part of the garden and avoids any tendency to flatness.

Shrubs 8, 9—These scandent shrubs provide an approach from the lawn to the archway leading to the House Section. Shrub 9 definitely terminates the drive under the porch and in conjunction with Shrubs 16, 17 serves to break the sharp lines of the house.

Shrubs 10, 11—These help to soften the front line of the house when viewed from the lawn.

Tree 12—This small tree is for shade purposes in the afternoon and to preserve the grass curve.

Shrubs 13, 14, 15—These are standards placed nearer the grass edge to balance the planting in the Drive Section.

House Section—This is a small section but important owing to its proximity to the house.

(i) Area to east of house—this has been set apart as a sitting-out place and is the most private part of the garden. It has been simply treated as follows:—

Archway—This affords a definite approach to the sitting-out place. It may be set in a low hedge or stand alone.

Shrubs 16, 17—These are scandent shrubs which break the line of the house wall.

Trees 18, 19—These are small screening trees.

(ii) Area to west of house—

Tree 20—This is a small tree which balances Tree 12 and with it provides afternoon shade. Together with Tree 23 it provides screening from the next house.

Shrubs 21, 22—These are scandent shrubs to fit in with the general scheme and break the line of the house wall.

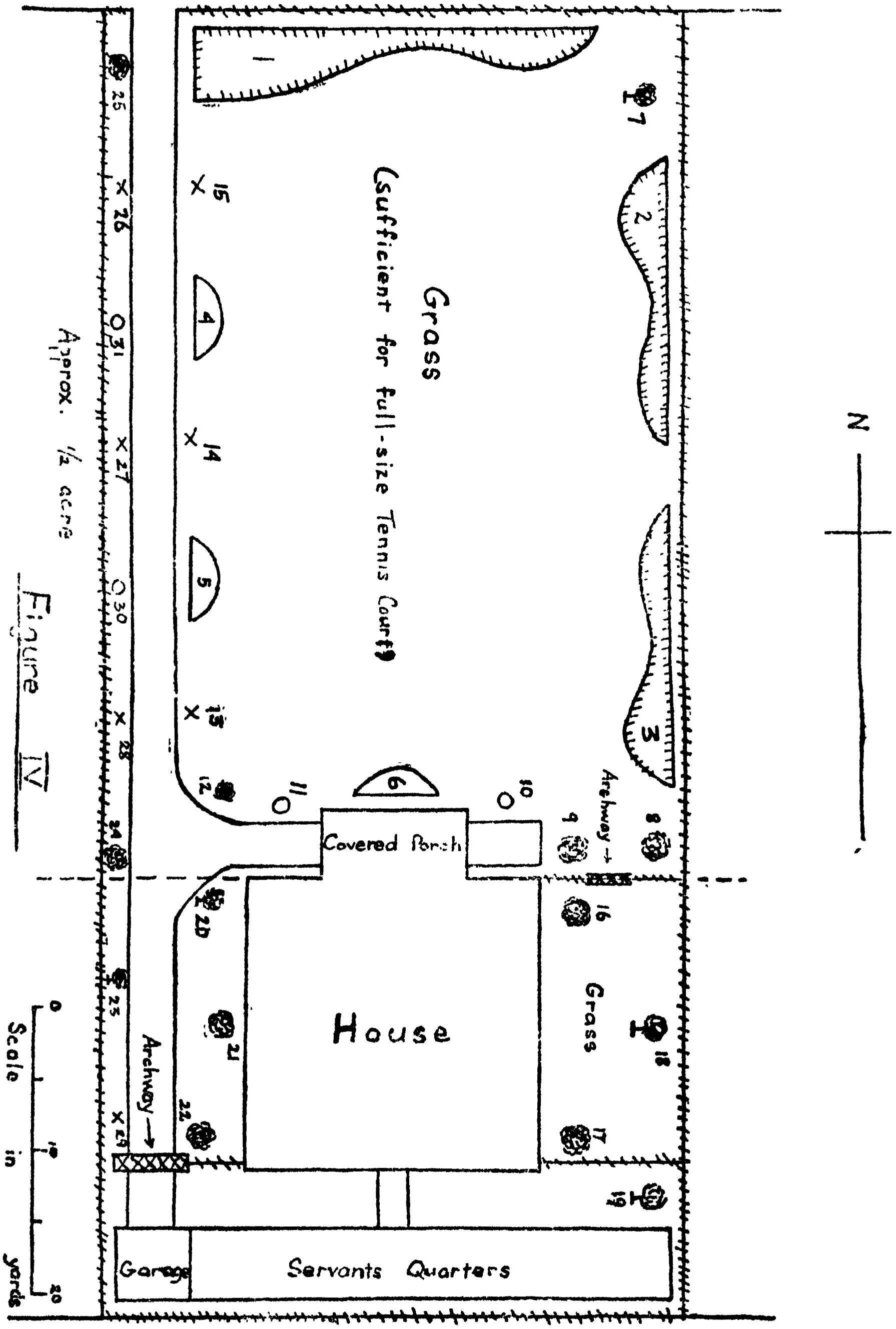

Grass
(sufficient for full-size Tennis Court)
House
Grass
Covered Porch
Garage
Servants Quarters
Archway →
Archway →
Approx. ½ acre
Scale in yards
N

Figure IV

Archway—This is a wide archway over the garage road. In addition to providing colour it serves to break the line of the hedge level and also proportionately balances the small archway on the east side of the house when viewed from the road end of the garden.

DRIVE SECTION—

This consists of the narrow strip of lawn between the drive and the west boundary hedge. It is one of the most difficult pieces of the whole garden to plant up really effectively for a too formal arrangement would be both unattractive and out of keeping with the general informality of the garden plan.

The following is the lay-out suggested for it:—

Tree 23—The function of this tree for screening purposes has been mentioned above.

Shrubs 24, 25—These can be either scandent shrubs or soboliferous palms (i.e. bush type). These should form good wide bushes.

Shrubs 26 to 29—These form a row of standards, placed nearer the edge of the drive and balanced by the row on the opposite side of it.

Shrubs 30, 31—These are shrubs of the ordinary bush type placed rather near the boundary hedge. These together with the row of standards and the two wide clumps of scandent shrubs or palms should tend to give an illusion of greater width to this piece of grass.

Plants suggested for Lay-out—

The names of suitable species are given under the various sections. It is not proposed to suggest colour schemes as this matter has been touched upon in previous papers and is, in anycase, a special subject which cannot be satisfactorily treated in an article of this description. These consist of hedges which should receive attention at all times.

BOUNDARIES—

The good or bad condition of the hedges will make all the difference to the ultimate result of the lay-out. Hedges most commonly met with are Hibiscus and Bamboo, both of which if properly treated make excellent hedges. There are other species which also make good hedges, these are Bixa, Acalypha siamensis, Bougainvillea, etc.

LAWN SECTION—

Border 1. This border is 15 ft. wide at its widest point i.e. beside the drive. It tapers to 4 ft. at its waist and then curves out to about 8 ft. before tapering off to the point.

It is 74′ long. This gives a bed of sufficient size to make either a shrub border, an herbaceous border or a combination of both. It is better that it be treated as a shrub border, for herbaceous borders are provided by Borders 2 and 3. Tall flowering or foliage shrubs should be used at the back, sloping down to medium ones for the middle part of the border and to small ones in the front section. The planting may be graduated lengthwise from the drive end down to the waist and then up again to the widest part of the small curve and down again to the point. By this arrangement an irregular height line is obtained lengthwise as well as in depth.

Tall Shrubs—*Flowering*—Ixora, Hibiscus, Randia, Duranta, Clerodendron, Kopsia, etc.

Foliage—Acalypha, Panax, etc.

Medium Shrubs—Brunfelsia, Galphimia, Lantana, Gardenia, etc.

Small Shrubs—Plumbago, Orthosiphon, Mirabilis, Turnera, etc.

Borders 2, 3—These borders are of a suitable size for herbaceous purposes and should be treated as such. Suitable plants are mentioned in the article dealing with Fig. III.

Beds 4, 5, 6—To avoid recurrent planting these might be planted with Cannas of colours suited to the general scheme.

Tree 7—A small ornamental tree is required—suitable species are Cassia fistula (Indian Laburnum) Peltophorum, Brownea, Saraca, etc.

Shrubs 8, 9—Scandent shrubs such as Bougainvillea, Bignonia, Congea, etc.

Shrubs 10, 11—Flowering shrubs such as Ixoras should be used for colour. Ornamental palms could be used if desired.

Tree 12—Small shade tree—Nephelium lappaceum (Rambutan) Eugenia sp. (Jambu) one of the small tree species. If a flowering tree is preferred Peltophorum ferrugineum or Cassia fistula can be used.

Shrubs 13, 14, 15—Standard Hibiscus.

HOUSE SECTION—

(i) Area east of house—

Archway—Honolulu, Clematis, Tristellateia, Odontadenia, etc. If set in a hedge, the latter should be a low one—Thunbergia erecta, Barleria cristata are suggested for this hedge.

Shrubs 16, 17—Bougainvillea, Congea, etc.

Trees 18, 19—Screening trees—Rambutan, Mangosteen, Spathodea (provided it is kept pruned to required height) Eugenia, etc.

(ii) Area west of house—

Tree 20—Small shade tree to balance Tree 12—Rambutan, Mangosteen, etc.

Shrubs 21, 22—Scandent shrubs—Bougainvillea, Congea, Bignonia.

Archway—If made wide enough is suitable for Bougainvillea Mrs. Butt, Odontadenia and all strong climbers.

DRIVE SECTION.

Tree 23—Screening tree—taller type can be used such as Erythrina indica (Dadap) Peltophorum ferrugineum, Mimusops Elengi, Adenanthera pavonina.

Shrubs 24, 25—*Scandent shrubs*—Bougainvillea, etc. *Palms*—Cyrtostachys Lakka (Red-stemmed Palm) Chrysalidocarpus lutescens, Ptychosperma spp. etc.

Shrubs 26 to 29—Standard Hibiscus to balance shrubs 13 to 15.

Shrubs 30, 31—Shrubs of bush type—Ixora, Kopsia, Bauhinia, etc.

HINTS ON THE USE OF FERTILISERS

BY

A. R. WESTROP, N.D.A., P.A.S.I.

No. 4 Ornamental Trees and Shrubs.

Whilst the East is generally considered to be poorer than temperate climes in the variety of its herbaceous annuals and perennials, it makes up for this in the splendour and charm of its great variety of flowering trees and shrubs.

The planting of bright flowering trees around bungalows situated in lonely districts or surrounded by monotonous plantations must go far to relieve the depressing effect inseparable from such situations.

Unfortunately estates in the planting districts of Malaya cannot compete in age with those of Ceylon or India, or perhaps "boom" conditions in rubber were not conducive to the taking of the long view needed in contemplating the planting of trees to be enjoyed by posterity and hence it is comparatively rare to find gardens well supplied with a really good selection of flowering trees. Even the "Flamboyante," Poinciana regia, is sufficiently uncommon on the roads or streets for the location of good specimens to remain in one's memory, whilst gardens possessing mature trees of Cassia nodosa, Amherstia nobilis or even Largerstroemia could be counted on the fingers of the hands.

Some of these trees and many of the flowering shrubs are quick in growth particularly if assisted by fertilisers, but unfortunately even Municipalities are apt to forget the latter item and one sees saplings languishing along the road side, which with the aid of manures could now be fine trees.

The Manuring of Flowering Trees.

It is usually difficult efficiently to manure trees of an advanced age owing to the competition of grass or other plants and attention should therefore be chiefly directed towards ensuring a vigorous start.

Well-rotted cattle manure in the bottom of the planting holes will materially assist but a longer effect can be obtained by the employment of such organic fertilisers as Whale Guano, Bone Meals or Steramcal. ½ lb. of the latter, which is a "complete" fertiliser, per hole has a very striking effect on most young trees and thus dressing may be increased up to 1 lb., where cattle manure is not available or the soil particularly poor.

In the case of backward young trees which must be manured from the surface, the soluble complete chemical fertilisers such as Supram or Enpekay applied in small doses of 4 to 6 oz. at six monthly intervals are very effective.

Flowering Shrubs.

Treatment of these fellows the same lines, but as they are often grown in beds or at any rate are "clean-weeded," it is easier to continue applications of manure.

Hibiscus, which is often heavy pruned, responds rapidly to a complete mixture, one obtainable locally analysing 8% Nitrogen, 10% phosphoric acid and 5% potash being particularly effective and the same fertiliser gives good results on Petrea, Congea, Gardenias, Oleanders etc.

Roses.

Are often looked upon as plants which can only be successfully grown in the hills but the successes of a few enthusiasts in the low-country of Malaya have proved that this is a fallacy. Careful cultivation, pruning and removal of the young excessive buds are required whilst roses respond to liberal manuring. Cattle manure and the organic complete mixture quoted above both give good results whilst Macmillan recommends a mixture of:—

Bone Meal	12	parts.
Sulphate of Potash	10	,,
Sulphate of Ammonia	5	,,
Gypsum	1	,,
	28	,,

Applied at the rate of ½ lb. per plant or per square yard of bed. Application of a soluble "tonic" juts before flowering is also valuable.

Bougainvillea.

Many varieties of this handsome plant can now be obtained and if planted so that the colours do not clash with those of other flowering shrubs or trees, Bougainvillea will prove a valuable addition to any garden whilst it is a particularly attractive shrub for use in tubs or large pots. Much controversy however exists on the question of the most suitable treatment of Bougainvillea, a general idea being that it should be "treated rough." Recommendations are accordingly made for pots or tubs to be filled with brick-bats, laterite etc: carefully excluding any manure. The writer followed this plan with two or three varieties but only succeeded in raising plants with miserably yellow foliage and no flowers. On seeing at the 1932 Malayan Agri-Horticultural Association Exhibition, a most magnificent specimen of *Mrs. Butt* which had been treated with a solution of Supram, he employed this fertiliser with gratifying results from his own specimen of this variety. Other varieties however merely put forth extra leaves and have given few flowers and so the correct method of treatment remains somewhat of a mystery. It would appear that varieties such as *Mrs. Butt,* which will flower whilst in leaf, respond to manuring but starvation produces most effective results with other kinds. Experiences of amateur gardeners in this connection would be welcomed by readers of the *M.A.H.A. Magazine.*

Miscellaneous.

THE CONTROL OF RURAL MALARIA

BY

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(Continued from p. 150, Vol. III, No. 3, July 1933.)

In the first part of this article the urgent need for a wide and energetic, yet simple, organisation for controlling Rural Malaria was indicated, and the further fact that 'natural' methods of control which utilise the free gifts of the countryside,—its soil, water, and vegetation,—were logically indicated, long predicted, and are at present the only ones available, for the purpose. But we must be on our guard against dogmatism. 'Natural' is an extremely dangerous word which in other connections, notably in political theory, has been assumed to imply the idea of inherent perfection,—an assumption not always in accordance with facts. But the case for natural control of malaria is supported by facts, being based upon successful practice guided by a study of the natural history of mosquitoes, especially that of their larval stage. There are reasons why this study was for long neglected, and why the deductions to be drawn from it are still regarded with some suspicion. One reason is that a very efficient method of artificial control, namely oiling, has been known for over a hundred years; and another is that people prize most what they pay most for. Another reason is that oiling is easy to carry out with poorly trained helpers, who are usually the only ones available; but the chief one is that oiling was adopted when it was the only method of larval control known, and when nothing at all was known about the natural history of mosquitoes, except that they bred in water,—nothing of the different kinds of water and the kinds of mosquitoes found in them. All this is now changed. Two generations of medical health workers have shown us where to look for the larvae of the species which carry malaria, and natural control is the art of applying this knowledge, (which is yet far from complete), by changing breeding-places which are suited to their requirements, into places which are quite unsuitable or impossible for them.

Observation and field experiment have shown that this control depends upon two quite distinct classes of facts: one is that the larvae, especially the young larvae of malaria-carrying species die in certain kinds of water, or very few mature. Sometimes the cause of death is clear,—namely a visible fungus or other parasite. But generally there is nothing to be seen. Investigation must go further and study the bacterial diseases and the nutrition of larvae before the riddle is solved. To test whether a particular water is unhealthy for larvae, eggs, or newly hatched larvae, just large enough to be seen, must be placed in it, and best in suitable cages in their natural surroundings out of doors, since water separated from its natural soil and kept in bowls rapidly changes. There is evidence from Malaya, from America (the first recorded), and now from Russia, that young larvae die in unsuitable water. This probably goes a long way to explain the absence for example of *A. maculatus* from coastal flat land; and the more general fact that any one kind of natural water usually contains larvae of only two or three species, many kinds never containing any anopheline larvae. Though paradoxical, it is therefore true to say that water is the enemy of mosquito larvae as much as it is their home. And we can go one, in fact several, better than Nature by using its resources, (the chief of which is rotting vegetation,), in excess, checking mosquito-breeding, and especially that of malaria-carrying species We can also regulate and multiply the sluicing effect seen in rapid streams and in other channels after storms. Its effectiveness is probably the result of several things besides larvae being washed away. One of these is that larvae and eggs are stranded and left high and dry; and another probably is that the disturbance of the soil in some way unfits sluiced channels for certain larvae. For example in the Cameron Highlands it was found that breeding did not occur again in sluiced channels purposely left unsluiced for about three weeks. So far therefore from regular sluicing endangering lower waters by washing larvae into them, when carried out by opening sluice gates once or twice a week, as far as could be seen no larvae were ever bred in the sluiced channels to be washed away.

These facts are mentioned because they show that the natural control of mosquitoes is founded upon scientific truth as well as upon practical experiment. Although many of the very complicated chemical and biological causes which produce the observed results have yet to be traced by ever more refined methods of investigation, the realisation of these facts should encourage the further exploration and application of natural methods. But it cannot be too strongly emphasised that, as in human warfare, all the available resources of science and inventive skill, whether natural or artificial, should be pressed into service in fighting the mosquito. Its methods of attack are more subtle and its habits more varied than those of any human foe. Therefore, it is not reasonable to limit our means of defence against it to one or two old methods, which though effective in limited areas like towns, are not suited to, or possible in, a general campaign throughout the country. An army which neglected most of the scientific discoveries of the last hundred years, would not be, or be considered to be, efficient. The need for greater effectiveness in combating the mosquito is shown by the fact that the computed deaths caused by malaria alone, without taking account of those due to other mosquito-borne diseases like yellow fever, throughout the world equals annually those which resulted during four years from the world war; and that the yearly economic loss to the world is about one hundred millions sterling. Although they occur but seldom, the ravages of war are realised to be calamitous, and every effort is made to arm public opinion against their recurrence. But because malaria is always with us, we accept it and are content with a very limited defence. Therefore before considering the natural methods which promise more extensive control, especially in rural areas, it will be of interest to glance at other methods of fighting the mosquito, which science and practical experience have made available. We shall then be able to compare their merits with those of the methods based upon natural processes. Some are of great scientific interest, and one at least, namely the use of slowly dissolving copper, and possibly of other minerals, holds great practical promise. But our review must be of the briefest.

Drainage

Drainage has hitherto held the first place among measures of mosquito-control. Its justification in commonsense is that the area of possible breeding water is reduced, defined, and rendered accessible, and easy to operate on and supervise. It is not perhaps sufficiently realised that by their expert knowledge of antimalarial drainage, Health Officers and the medical supervisors of estates enormously reduce the cost of oiling. It is clearly not fair to consider only what is spent without taking account of the much greater expenditure and greater risks which would be involved if land was not drained, or was badly drained. Unskilfully cut shallow open drains needlessly add to the area of water requiring to be controlled and its attendant risks. Deep hillfoot drains reduce, while effective subsoil drains abolish, both alike. But the high cost of subsoil pipes and the need for expert laying and maintenance make them quite unsuitable for kampongs and their surroundings. Nevertheless it is interesting to remember that subsoiling, which has been skilfully adapted to antimalarial work in this country, was copied from the agricultural practice of Europe, and that wherever crops or building land are of sufficient value, it more than pays for itself.

But of chief interest to the problem of rural malaria is the comparatively modern observation, originally made by Sir Malcolm Watson, and confined by Dr. Bentley in India, that large areas of water, such as those in our coastal ricefields, are not malarious, or only very slightly so, and the further fact that stagnation of the water, and accumulation in the soil, due to lack of drainage, diminish the risks from malaria. Such water usually has a dull brown colour, and few or no floating algae; and to be able to recognise it and leave it alone is an important factor in the control of rural malaria.

Oiling.

Very little need be said on this subject except to remind ourselves that oiling kills crops and fish.

It is also said to increase silting and the blockage of drainage channels by gathering together clots of debris which sink. Butterflies alighting on oiled water are often killed, and I have seen this occur. But the belief that oil is poisonous to ducks is unconfirmed, although their plumage must suffer. The oiling of drains makes it difficult to grow shade plants which might offer a permanent protection against *A.maculatus* and eventually greatly reduce the cost of control. Sluicing on the contrary permits shade plants to grow up, and when this occurs, sluice-gates may be replaced by them. Oil acts both by suffocating larvae, whose breathing tubes it penetrates, and by poisoning them by its vapour. Owing to its forming a thin film, it is usually cheaper to use than liquids which mix with water or dissolve in it; and the practical difficulty of calculating the amount of these liquids required for the volume of each lot of water treated does not arise. Good oiling fluids are extremely effective, and should be used wherever other cheaper and less destructive methods cannot be used. But the the general and universal use of oil adds a heavy item of expenditure to anti-malarial control, and acts unfavourably upon foreign exchanges, owing to the cost of the oil having to be met by money or goods sent abroad. Apart from its deleterious effects upon crops etc., the cost of its general use in cultivated areas in this country would amount to many millions of dollars annually, and such cost is prohibitive, here or elsewhere.

Paris Green.

This is a green powder, *aceto-arsenite of copper,* which is mixed with road—or saw-dust, or charcoal powder, in the proportion of one or two parts per hundred by volume, and is blown over the the water by special blowers, wind aiding. In this way it may be distributed much further than oil, at least thirty or forty yards or more when a powerful engine-driven blower is used. Or it may be distributed from aeroplanes. It is extensively used in Italy, where the malaria, unlike most of our own, comes largely from marshes and the reed-covered margins of rivers. But although tried in similar places in this country, especially in the saline ponds in which *A.ludlowi* often breeds, it has on the whole proved dearer and less suited for distributtion by coolies than oil. The reason for the latter fact is that their work cannot be checked, because, as found by Dr. Scharff, Paris Green leaves no trace of its presence next day, even when mixed with powerful dyes. Another point in which it is inferior to oil is that it kills very few culicine larvae, the reason being that the powder floats on the surface of the water, and that culicine larvae, unlike anopheline, feed mainly below the surface. Paris Green being (unlike oil which is a *respiratory poison*), a *mouth-poison,* obviously cannot kill larvae unless it or its impurities and the products of its decomposition are swallowed. A third, though minor, defect of Paris Green, is that it is without any action upon either the eggs or the pupae of mosquitoes. Both the copper and the arsenic in Paris Green are poisonous to larvae; and it was at one time feared that accumulation of the arsenical compounds in the water of ponds etc. might poison cattle and other domestic animals. But only one or two cases of poisoning are on record; and it has been proved that a fungus similar to those that grow on cheese, a *Penicillium,* causes the arsenic to be dissipated in the form of a gas, arsenuretted hydrogen, which though intensely poisonous does no harm in the open air. But the same, or a similar fungus has led to poisoning in rooms papered with wall-paper containing arsenical pigments . Thus at every turn we are reminded of the importance of the science of Biology in human affairs.

It has been proposed to use a solid form of formaldehyde instead of Paris Green, and this is obtainable in proprietary form from France; but results in this country have not been encouraging, and the principle of using expensive chemicals where commoner ones serve, and especially those which are put on the market for profit under trade names is unsound, and it is most necessary to make sure that the price of the latter is not disproportionate to their content. Many other, if not most, powders, especially those containing minerals, might also be used to kill anopheline larvae, if distributed on water, but is is unlikely that any cheaper or more efficient than Paris Green exist. I have for example observed that *carmine*, an organic compound produced by the cochineal insect, is effective in bowls; but its cost would be altogether excessive.

Gas and Vapour Poisons.

It is not usually realised that since they breathe air both the larvae and the pupae of mosquitoes are killed by very low concentrations of poisonous gases and vapours, and that under certain conditions, gas warfare against mosquitoes is a practical proposition. On open water out of doors the costs and dangers of the method make it of doubtful usefulness, but it is quite feasible in wells, especially in deep ones. In fact, concentrated doses of atmospheric poisons have been proved to kill all larvae and pupae even in shallow open wells. There are however, few wells in this country. Careful experiment has shown that concentrations of one part in a million or even less are effective in about an hour or even less, when prussic acid gas or very poisonous vapours are used, and much higher concentrations of less dangerous compounds may be produced in wells. A very interesting fact is that the average time taken to kill larvae of particular species, previously tested, enables the strength of very low concentrations of vapour to be ascertained, when no chemical tests can determine them. This is one more example of the breadth and refinement of biological methods of investigation. Another interesting fact is that when used in a small, or even a fairly large volume of air, much less of a poisonous gas or vapour is effective than even the small amount of a substance like oil which covers the surface of water. In other words, weight for weight, gases and vapours are the most efficient destructive agents known to science, even when used against larvae and pupae. Adult mosquitoes, owing to their breathing more quickly, are killed three or four times more easily. On the other hand, the eggs of mosquitoes and other insects are very little affected, owing to the extremely slow penetration of their horny shells. There is some slight evidence that strong concentrations of irritant vapours cause the premature hatching of larvae, which owing to this fact, or because they have been slightly poisoned, die quickly. A stimulating vapour is said to be used by the Japanese to make the eggs of silkworms hatch.

Light and other Rays.

It is a matter of common experience that most mosquitoes, unlike moths and most other insects, are hardly at all attracted by light. *A.maculatus* for example will fly through the circle of light cast by a reading-lamp. It is apparently otherwise with some species in other countries. The visitor to Nice in the South of France in August is devoured by mosquitoes on going to bed, if he has failed to shut the window of his room while undressing. It is possible that the more intense beams of a searchlight might attract our local mosquitoes and enable them to be trapped; and some years ago success with this method was claimed from Europe, but the claim has never been confirmed. More recently, strong beams of invisible ultraviolet are said to have been used with convincing and very beneficial results in the marshes of Eastern Europe. It would be very interesting to learn whether our local mosquitoes, and especially those which carry malaria, can be attracted in this way; and although the expensiveness of the apparatus needed would make the general application of the method impossible, it might prove an extremely valuable aid in investigating the haunts and distribution generally of our mosquitoes, if we could charm them from their hiding places, about which so little is known. No one yet appears to have tried the effect of concentrated infra-red rays, which are coming into use for photography and the detection of objects at night; but mosquitoes settle upon warm objects from which these rays are always emitted.

Finally, there exists an entirely different kind of vibrations, those of sound, and of sound carried beyond the range of rapidity at which the human ear can distinguish it, which is variously placed at between 32,000 and 48,000 vibrations a second, or between seven and eight octaves above middle C. The squeak of a bat is about on this limit, many persons losing the power of hearing it on the approach of middle age. The note given out by a mosquito when it is in flight is considerably lower, and the beat of the males' wings when they dance in the air, may very likely guide virgin females to their assembly. There is clearly a field for interesting experiment, but the practical usefulness of musical notes as a means of attracting and trapping mosquitoes is probably very limited. Greater possibilities of their destruction and that of their larvae lie in so-called *"supra sonic" vibrations*, much more rapid than can be heard. These generate heat and destroy animal tissues, but no practical application is possible, least of all with coolie labour, unless the delicate and costly apparatus by which these vibrations are produced is improved, and its range of effectiveness, now apparently limited to a distance of from a few inches to a foot or two, is greatly extended. And, were this the case, other denizens of the water, such as fish, might be killed or injured.

(*To be continued.*)

Selangor Gardening Society.

Members are notified that it has been decided not to hold the Autumn Flower Show this year, the next show will be held towards the end of February next year.

Two meetings have been held recently, the first on 29th August when Mr. E. D. Butler gave a talk entitled "Some remarks on Gardening," at the second, held on September 3rd, a paper on the "Insect Pests of Ornamental Plants" was read by Mr. N. C. E. Miller, F.R.E.S. This paper will be published in the next issue of this Magazine.

Hybrid Amaryllis: (Hippeastrum)

About three years ago I imported from Holland some of these bulbs which flowered immediately on arrival. Since when only one or two bulbs have flowered at long intervals although having been rested for a long period and dried off as far as it is possible in this country.

Recently I dried off for three months half a dozen bulbs which, through the kindness of the Cold Storage, I was able to have stored by them for about 10 weeks in a temperature of between 38° and 40° fahrenheit.

These I planted on the 1st September, two bulbs have already flowered and three others have thrown flower spikes and will be in bloom about 10th October, only one bulb out of the six has produced no flower spikes, while two bulbs actually produced two flower spikes each. E.D.B.

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